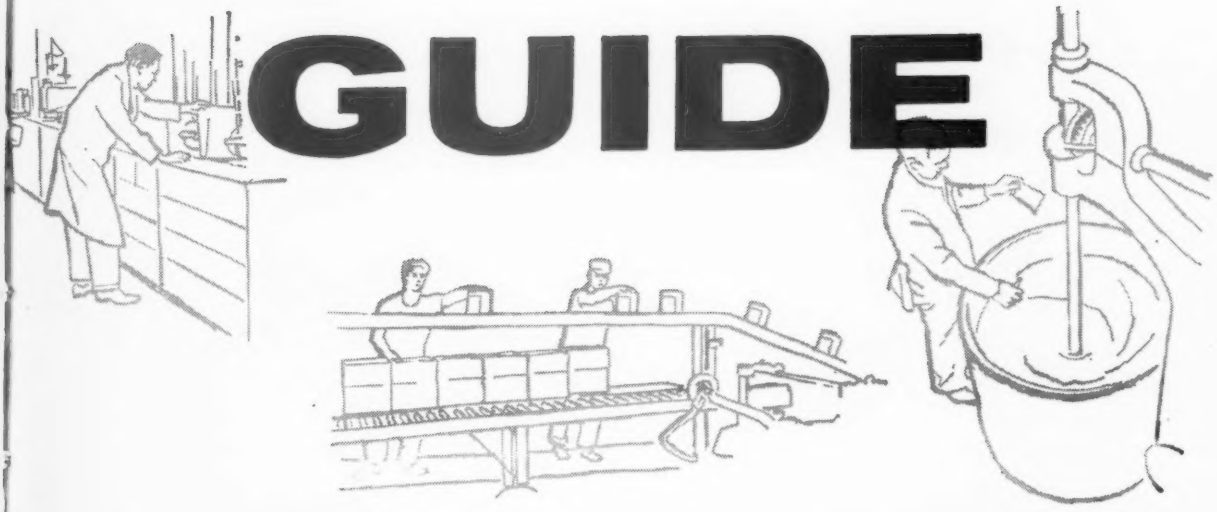
PVP

PAINT & VARNISH PRODUCTION

1960 BUYERS' GUIDE



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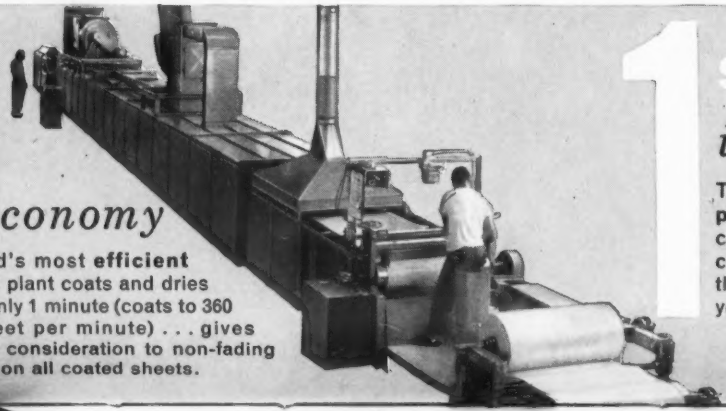

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INCORPORATED

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For more information circle No. 2—last page

(REG. U.S. PATENT OFFICE)

MARCH
1960

Formerly PAINT and VARNISH PRODUCTION MANAGER
(Established in 1910 as The Paint and Varnish Record)

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NO. 4

1960
REVIEW and BUYERS' GUIDE

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Directory Section 173

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for the Paint, Varnish, and Lacquer industry

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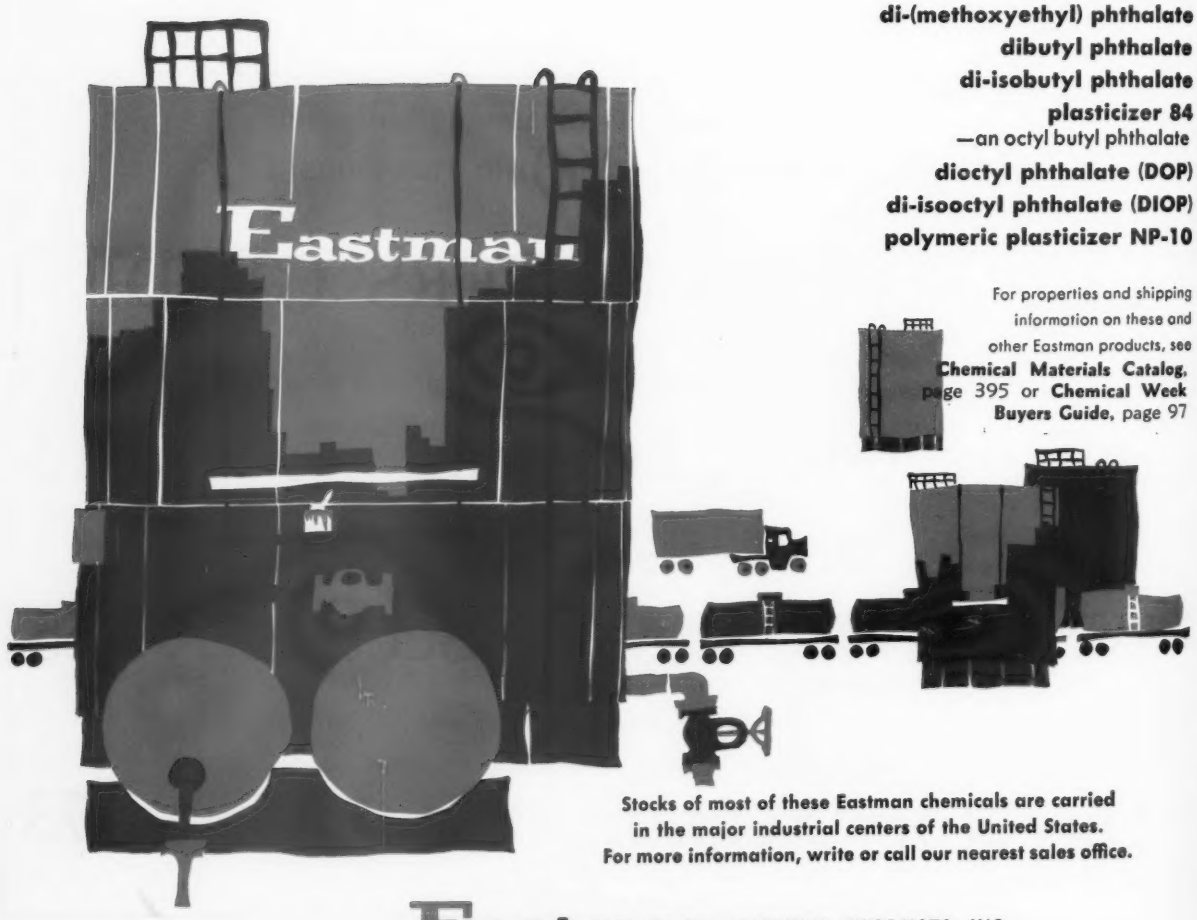
polymeric plasticizer NP-10



For properties and shipping information on these and other Eastman products, see **Chemical Materials Catalog**, page 395 or **Chemical Week Buyers Guide**, page 97

Stocks of most of these Eastman chemicals are carried in the major industrial centers of the United States. For more information, write or call our nearest sales office.

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Paint Mixing...

Top of mixer extends to second floor where it is charged. Note dust control hood.

Note thoroughly dispersed and blended latex paint in mix just before discharge.

Finished mix is discharged on first floor through valve in bottom of mixer.

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*Celite is Johns-Manville's registered trade mark for its diatomaceous silica products.

JM PRODUCTS Johns-Manville CELITE Diatomite Pigments

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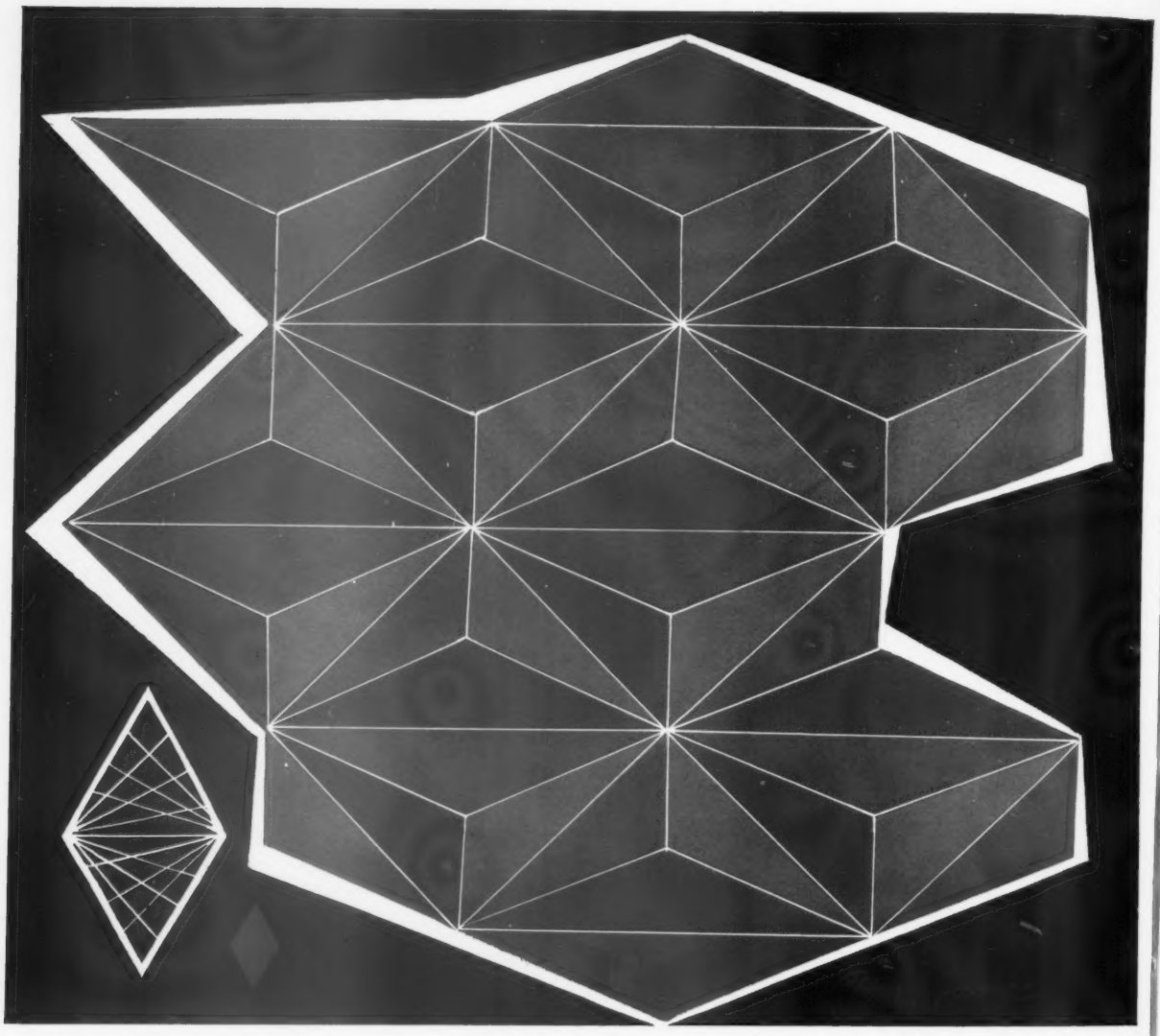

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HOW TO USE THE REVIEW AND BUYERS' GUIDE

THE 1960 REVIEW AND BUYERS' GUIDE is the eighth in a series of annual summaries covering the technological developments in the paint industry. The series is intended as a guide to the technical literature and as a source of information relating to the various phases of paint technology.

The format of this special issue is divided into three sections: The Buyers' Guide Section, World Wide Review of 1959, and The Directory Section.

The World Wide Review section covers technical developments that occurred during 1959 in the fields of Synthetic Resins, Latex Emulsions, Drying Oils and Derivatives, Solvents and Intermediates, Pigments, Driers and Additives, Production, Industrial and Architectural Coatings, Corrosion, Aerosols, Performance Testing and Chemical Analysis. It will be noted that coverage of foreign journals has been increased (including the Russian); further, coverage of patents has been enlarged.

Bibliographies are listed under individual subjects at the end of the entire text, page 166, so that those interested in reviewing the literature, whether for the whole field or for a limited subject, will have at hand a compilation totaling over 600 citations.

Seven different listings comprise the Directory Section: These include the following listings: Suppliers of Raw Materials and Equipment, Canadian and Mexican Addresses of U. S. Firms, Materials and Equipment, Aerosol Suppliers, Sales Agents and Distributors, Trade Associations and Societies, and Trade Names. All listings have been expanded and brought up-to-date over last year's Review and Buyers' Guide.

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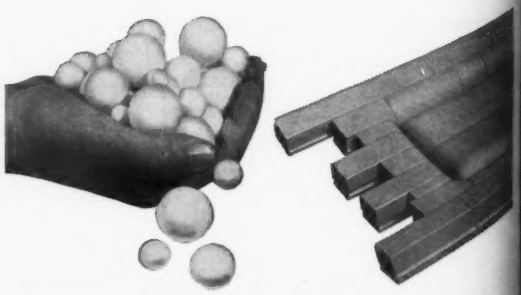

High density, tough bond ARLCITE grinding balls and mill lining blocks—for the ultimate in high speed grinding, economy and endurance. *A product of the Porcelain Division, Ferro Corp.*

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For more information circle No. 7—last page

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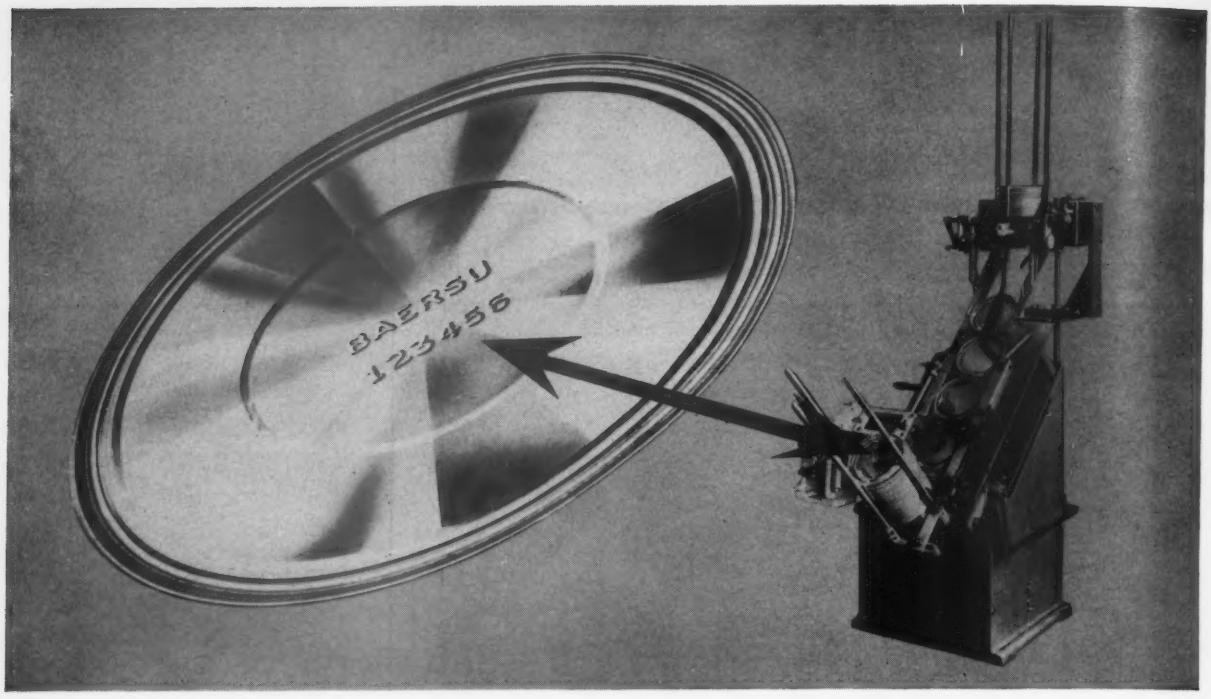
BUYERS' GUIDE

PACKAGING

MATERIAL HANDLING

NEW EQUIPMENT and MATERIALS



Can Lid Coding YOU CAN COUNT ON!

For can lid marking that's Permanent, Legible and Fast . . . it's the Matthews New Model No. 3200 Embosser. If you use temporary or removable marking that may be smudged, obliterated or blurred, you should use the method that so many leaders in the paint and associated industries have standardized on . . . the Matthews production embosser. The marking is fixed in the metal itself, in smooth raised characters, and at speeds as fast as you desire.

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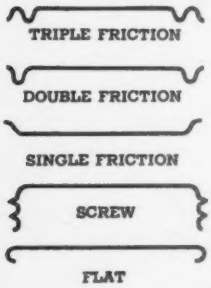
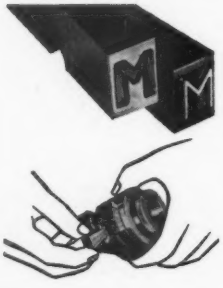


The standard No. 3200 and the No. 3201 are designed to accommodate single, double or triple friction style lids. These models can also be equipped to handle flat, square, rectangular or oval lids, if required. The No. 3202 and No. 3203 are designed to automatically handle double and triple friction style lids. All models are adjustable through a wide range of lid diameters.

Roller type action



One, smooth rolling action provides continuous embossing of one or two lines of coding in the can lids as they pass between the carefully engraved interchangeable rollers. The simplicity of the Rotary Action design provides freedom from mechanical failure and maximum embossing efficiency. Easily changed male and female embossing type are engraved with 3/16" size characters.

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For more information circle No. 8—last page

This section contains a compilation of new materials and equipment introduced in 1959. While every effort is made to include only reputable products, their presence here does not constitute an official endorsement.

ACRYLIC RESIN
For Metal Coatings

Acryloid A-21, said to be a clear, colorless, rapidly drying, hard polymer solution was developed for use in automotive finishes and other metal coatings.

Outstanding among the properties of this acrylic resin is its adhesion to many different surfaces. Acryloid A-21 adheres firmly when formulated as either an air-drying or baking top coat on bare metal or commercial primers for automobiles and appliances.

Durability under extremes of sunshine, humidity and low temperature is another notable feature of coatings made with this acrylic polymer. Wide ranges of colors are now possible for plastics, automotive, metal, wood and fabric coatings because Acryloid A-21 is claimed to provide excellent dispersion with pigments and metallic powders in various combinations. Infrequent polishing is required to maintain the high lustre of these acrylic lacquer finishes.

Resinous Products Division, Rohm & Haas Company, Dept. PVP Washington Square, Philadelphia 5, Pa.

ACRYLIC RESINS
For Metal Coatings & Finishes

The production of two new thermosetting acrylic polymeric resins for coatings has been announced. Because the acrylics have always been considered thermoplastic, this is a big step forward in coatings technology. The two new products, which are baking enamel components, are a solution polymer designated Acryloid AT-50, and an emulsion polymer designated Rhoplex AC-200.

Both of these compounds are suggested for formulation into metal coatings and finishes. Acryloid AT-50 is made available in organic solvents. It cures at standard enamel baking temperatures to an extremely hard, glossy film with excellent resistance to soaps, detergents, stains, and solvents.

The acrylic emulsion polymer, Rhoplex AC-200, is supplied in an aqueous medium. Upon baking, it is converted to a hard, glossy, water-resistant film with excellent chemical, humidity, adhesion and impact resistance.

These new preparations are intended for finishes on automobiles, steel drums, machinery, hospital equipment, metal furniture, stoves, and in other quality metal finishes.

Resinous Products Division, Rohm & Haas Co., Dept. PVP, Washington Square, Phila. 5, Pa.

ACRYLIC-VINYL LATEX
Low Particle Size

New product, called Cofar, is designed to embody the better characteristics of the acrylic and polyvinyl acetate systems.

It is reportedly an ideal vehicle for primer-sealers, interior paints, exterior brick, cinder block, and masonry coatings.

Because of its low particle size, high quality paints can be made at high pigment volume concentrations.

Properly formulated Cofar paints are said to show no pH drift on aging. Outstanding sheen, even on surfaces of varying porosity, is claimed.

Farnow Inc., Dept. PVP, 4-83 48th Ave., Long Island City 1, N. Y.

AEROSOL SPRAY BUTTON
With Impressed Arrow

A newly developed aerosol spray button, which has been designed to meet problems prevalent in the paint industry, has been introduced.

The new button incorporates an impressed arrow in a second color so that the direction of spray flow can be seen instantly. The impressing and coloring of the arrow is an integral part of the molding operation and can therefore be made available at practically no increase in cost over conventional buttons.

Precision Valve Corp., Dept. PVP, Yonkers, N. Y.

AIR CAP
For Spray Painting

A new air cap for automotive spray painting, designed especially for use with the new acrylic and enamel automotive finishes, has been announced.

Designated Model 154, the new spray nozzle is designed to give a "super-soft-spray," which is described as having a wider, wetter pattern.

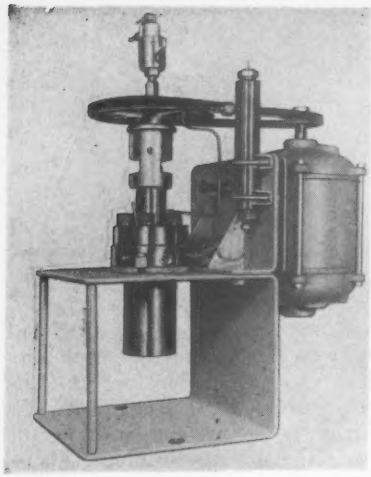
Design of the nozzle involves the special location of two secondary jets so that they will intercept the side jets to reduce the impact and resultant forward velocity of the spray pattern. Consequently, a broader, softer and wetter spray with more thorough flow-out for a smoother, glossier coat is attained. Better adhesion of the new finishes is also claimed by this improved spray pattern. The distinctive tapered face of the cap has been developed to give smoother air-flow into the spray pattern and reduce the turbulence found over the blunt face of conventional nozzles.

Other features include a sturdier ring to withstand bumps and new resilient O-ring for three-way sealing against air leakage.

The DeVilbiss Co., 300 Phillips Ave., Dept. PVP, Toledo, Ohio.

AUTOCLAVE
Bench Scale Research

A new autoclave designed for



PRESSURE PRODUCTS

bench-scale research is now being manufactured.

The new 300 ml., 5,000 p.s.i.g., stirred reactor together with its stand and motor is only 26 inches high and requires a 20 x 12 inch space. It can be mounted on the floor, a bench, or the wall.

The P. P. I. stirrer shaft is water cooled and is guaranteed for 500 hours operation. Shaft speeds of up to 1,500 r. p. m. can be used. An outstanding feature is a special intensifying lubrication cylinder which can be used with either oil or water. The reactor can be furnished with any of the following types of stirrers: marine propeller, turbine, paddle or gas dispersing (Gasperator).

Other features include: a new spiral grooved jacket for rapid heating and cooling, which can be used with or without an electric heating mantle (standard electric heating can also be supplied); the simple, flat bolted closure has a fully confined, spiral wound gasket; the body flange can be provided with up to six openings, including the ½" rupture assembly—this makes it unnecessary to disconnect tubing when removing cover; the reactor body is securely held to the mounting stand by two readily accessible bolts.

The standard motor furnished with the unit is a one-half horsepower, 110/220 volt, single phase, Class I, Group D.

Pressure Products Industries, Inc., Dept. PVP, Hatboro, Pa.

BALANCE
Determines Moisture Content

A moisture balance for fast and highly accurate determinations of moisture content in a wide variety of materials has been designed.

Principal feature of the new model is its built-in autotransformer which regulates voltage automatically and provides more convenient temperature control than previous moisture balances in which the autotransformer was a separate unit.

Simple to operate by even an inexperienced laboratory technician, the moisture balance is capable of reducing from one-half hour, or more, to only a few minutes,

CENTRAL SCIENTIFIC

the time required for accurately testing the moisture content of a material.

According to the firm, the balance operations simultaneously, thus eliminating time-consuming weighing of samples on an analytical balance, with subsequent drying in a vacuum oven and then reweighing.

To operate the Cenco moisture balance, a 5 gram sample (exact weight need not be known) is placed in the balance pan and the indicator crank is set for 100 per cent moisture. The hood is then lowered, the lamp switch turned on, and the infrared heat quickly penetrates deeply into the sample. A few minutes later, with moisture driven off, the per cent of moisture lost is read directly on an easy-to-read calibrated scale.

The unit also comes equipped with disposable weighting dishes, made deeper than former models.

The built-in magnetic damper reduces pan vibrations and speeds weighings. An extra torsion wire for 25 gram samples is supplied for handling heavier loads.

Central Scientific Co., c/o Richard S. Smith & Associates, Dept. PVP, 176 West Adams St., Chicago 3, Ill.

BALANCE
Records Weight & Temperature

New automatic, recording analytical balance is available. This new electronic instrument simultaneously records both weight and temperature against time.

The model has two pens, using different colors, and records both weight and temperature against time on the same chart.

For thermogravimetric analysis the sample can be suspended from the balance and weighed in a furnace. For differential thermal weighings, samples can be suspended from both pans of the balance. The balance is claimed to be accurate to plus or minus 1/10 mg., has a capacity of 200 grams, and temperature ranges of minus 25°C. to plus 525°C. or minus 50°C. to plus 1050°C. Both weight and temperature readings are linear.

Wm. Ainsworth & Sons, Inc., Dept. PVP, 2151 Lawrence St., Denver, Colo.

TORSION BALANCE

BALANCE
Simple Graduated Dial

Weighings, it is claimed, now can be made in 1/3 of the time with a new dial balance. Its capacity is 500 grams.

The new design features a simple graduated dial which can be turned without arresting the oil-damped balance, replacing the time-consuming "cut-and-try" procedure necessary with graduated beam and slide weight of conventional balances. This means that the

time-consuming portion of the weighing (below ten grams) literally can be "dialed in" in 1/3 the time.

The new dial mechanism retains its original accuracy after more than a million weighings. The firm has unconditionally guaranteed the new dial mechanism.

Previously most conventional laboratory balances used a graduated beam and slide weight for "fine" weighing after the weight had been determined within 10 grams. Under the old procedure the balance is arrested, slide weight positioned, balance released, balance comes to rest, position of indicator noted, balance arrested again, slide weight repositioned and so on until the weight is determined within 0.1 gram.

The new dial is graduated from zero to 10 grams by one-tenth gram (0.1) graduations. The dial is readable to 0.02 gram. The balance is oil-damped to minimize oscillation and greatly facilitates the weighing operation.

The metal case has a corrosion resistant gray finish constructed to exclude dust and chemicals. The unit measures 11¾ x 6 x 6¾ inches.

The Torsion Balance Co., Dept. PVP, Clifton, N. J.

BENCH CAN
Spring-Actuated Dasher

The problem of cleaning small metal parts in gasoline is said to be solved by a new safety bench can.

To minimize waste and speed the operation of cleaning small parts or swabbing larger ones, the firm has designed special features into the new can approved by Factory Mutual for industrial use. It has a spring-actuated dasher which is perforated and flush with the top of the can, to reduce evaporation losses and minimize explosive vapors. The dasher, coupled with baffles, protects contents of the can from fire. The entire can is constructed of heavy-gauge coated sheet steel, with red enamel exterior finish.

The safety bench cans are available in one- and two-quart and two-gallon sizes.

Eagle Manufacturing Co., Dept. PVP, 3032 Charles Street, Wellsburg, W. Va.

CAN DEPALLETIZER
To Handle Round Cans

Two new empty can depalletizing machines which operate at normal line speeds and handle all types of round cans have been designed.

The Manual machine will depalletize cans at speeds up to 700 cans per minute for the 300 x 407 size, fully utilizing the operator who manually sweeps the layers of cans into the waterfall blender. It is tailored to keep capital investment at a minimum, while providing simple design, rugged, compact construction and safe operation.

The Standard machine is more highly mechanized than the Manual, with can handling speeds increased up to 900 cans per minute for the 300 x 407 size and a reduction in operator utilization. Among its advantages are a powered sweep arm and a can transfer (temporary storage) belt.

The sweep arm assembly is located at and is limited in height to the tin line, affording added visibility and increased safety to personnel over other machines.

Emergency stop action can shut off the sweep arm regardless of its position. The sweep arm stops gently at each end of its travel and automatically retracts when the control is returned to neutral. The pallet hoist is interlocked with the sweep arm so that the hoist will not raise unless the sweep arm in retracted, precluding serious machine damage.

Contintenal Can Co., 100 E. 42nd St., New York 17, N. Y.

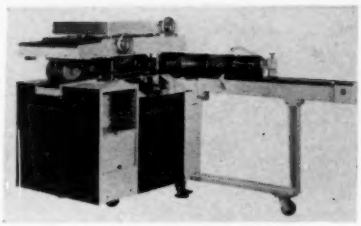
CAN IMPRINTER
¼ Pint to Gallon Cans

New can imprinter has been announced.

The clarity and quality of the imprint is said to match the quality and style of the lithography on regular or aerosol cans.

This machine will handle cans or containers made of metal, plastic or fibre either filled or empty. Only two settings are required to change can size from ¼ pint to a gallon (with or without ears). The 8" x 11" plate or individual type can be changed in a matter of minutes.

Machine is completely self-powered for production use, it is compact (4 x 8 foot floor space) and built on castors for easy mobility.



CHARLES BECK

Charles Beck Machine Corporation, Dept. PVP-1, King of Prussia, Pa.

CAN SORTER
High-Speed Unscrambling

Automatic can sorter features a unique magnetic pulley to turn the cans so open ends are all in the same direction, ready for the filling cycle.

In operation, scrambled cans are fed into the bottom of the can sorter. Oscillating rubber "sweeps" lay the cans end-to-end in rubber-covered channels or flights. These flights lift the aligned cans, with their ends at random, to the top of the can sorter where they are released in rows to single file carrier belts which carry the cans to final sorting mechanism—the magnetic pulley.

The magnetic pulley, acting on the greater mass of the can bottom, properly orients the cans and feeds them to a can elevator or directly to the filler conveyor.

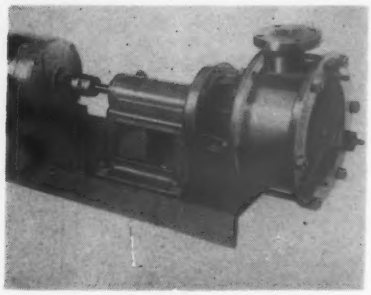
Models are available to handle all standard cans up to 32 ounces, or any group of can sizes provided the smallest can is approximately one inch longer than the diameter of the largest can. Rubber bin sweeps and rubber-edge flights protect the finish of the cans and will not bend or damage open ends.

George J. Meyer Co., Dept. PVP, Box 452, Milwaukee, Wis.

CENTRIFUGAL PUMP
All-Plastic

New line of all-pastic PVC centrifugal pumps is now available.

Pumps are constructed with all wetted parts of unplasticized, unmodified polyvinyl chloride, offering the broadest possible range of chemical resistance as well as the non-contaminating transfer of sensitive solutions. Available in four pump sizes, these units offer capacities from 10 to 180 GPM



VANTON

with discharge heads to 100 ft. Solution temperatures to 140°F. can be handled.

The heavy sectioned PVC casing is totally protected by a cast iron frame giving rigid support. The impellers are molded and are of a dynamically balanced design. Vanes are contoured to offer maximum efficiency.

All PVC centrifugals are equipped with mechanical shaft seals of the latest design which are available in a range of materials to cover virtually all corrosive applications.

Unit is so designed that stationary rings can be reversed for additional use after long periods of service.

Simplicity of maintenance is also featured in this new line. By removing just six bolts, the casing may be opened and the impeller inspected or replaced without breakdown of the entire pump. The heavy duty shaft, constructed of stainless steel with a PVC cover on the wetted end, can be removed from the pump from either direction.

Vanton Pump & Equipment Co., Dept. PVP, Hillside, N. J.

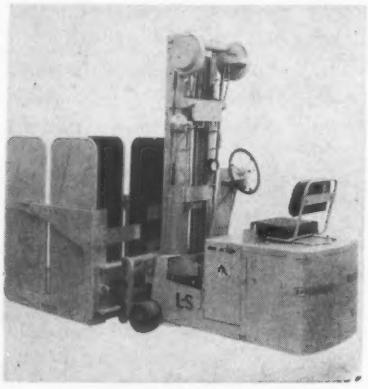
CIRCULATING PUMP
30 to 55 Gallon Sizes

To answer the need for pumping and circulating reasonably light viscosity materials from open end drums and tanks, new circulating pump has been developed. There are no priming problems here because the pump is completely immersed in the liquid. The centrifugal design delivers a smooth, non pulsating flow. Volume may be regulated at will.

The air motor-driven model is explosion proof and output may be varied by regulation of the air volume. These extra long models can be used with lacquers, light viscosity printing inks, coating compounds, oils and paints.

They are available in lengths for 30 gallon and 55 gallon size drums and shorter lengths. The ½ H.P. sizes deliver 20 G.P.M. at a 22′ head. The ¼ H.P. sizes deliver 10 G.P.M. at a 16′ head, with a 300 S.S.U. liquid. Various flanges and special tanks are also available.

Graymills Corp., Dept. PVP, 3705 N. Lincoln Ave., Chicago 13, Ill.



LEWIS-SHEPARD

CLAMP ATTACHMENT
Allows Palletless Handling

New carton clamp attachment for use with L-S electric trucks has been made available.

The Spacemaster 24 Volt Model "H" with cascade clamp and carton grab arms is said to provide economical, efficient operation and better utilization of warehouse space through palletless handling of cartoned goods.

The carton grab arm design insures equal distribution of clamping pressures over the entire contact area, so that even the most fragile containers are readily handled without damage.

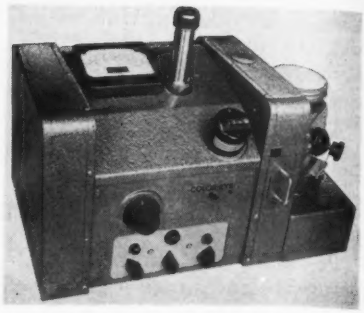
High friction contact surfaces on the plates prevent scuffing and reduce the clamping pressure to a minimum.

Lewis-Shepard Products Inc., Dept. PVP, 125 Walnut St., Watertown 72, Mass.

COLORIMETER
Dual-Purpose

A new model of Color-Eye, the dual-purpose colorimeter and abridged spectrophotometer, has been announced.

The new "Model D" Color-Eye combines the advantages of earlier models with several important



INSTRUMENT DEVELOPMENT

new features. These features include a "flush sample viewing port" which allows the instrument to be placed against any flat, vertical surface for color measurements.

The optical section contains a new photomultiplier with new, specially matched filters to provide more consistent match to C.I.E. standards. This new optical section improves sensitivity ten fold and increases the present high sensitivity of the instrument in measuring colors throughout the entire range from very dark to light.

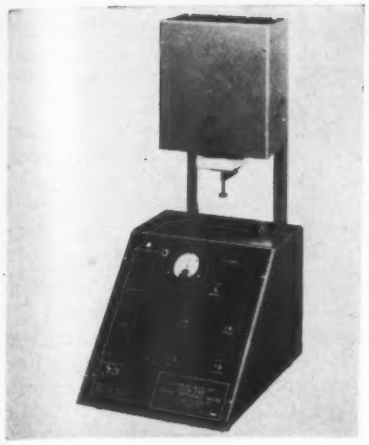
Instrument Development Laboratories, Inc., Dept. PVP, 67 Mechanic St., Attleboro, Mass.

COLOR METER
Digital-Dial

A precise, digital-dial Color and Color-Difference meter has been developed.

The new instrument is intended primarily for small color differences found in the paint and plastics industries. It employs tristimulus filters and vacuum phototubes which are thermostatted for maximum stability. The analog scales of the instrument have nearly the uniform visual spacing of the Munsell Color System.

A new color-difference attachment gives components of color difference between sample and standard and then total color difference using an equation in which weighing factors may be adjusted to conform to visual grading practices for the product under study. Noteworthy features of the new instrument are: Digital dials which have separate plus and minus windows for the *a* and *b* scales; zero centered *a* and *b* potentiometers which eliminate polarity switches; electrical rather than mechanical adjustments to standard, vacuum-tube galvanometer with rugged microammeter



HUNTER

not disturbed by building vibration; and uniform indication of direction of rotation for all dials and scale knobs.

Hunter Associates Laboratory, Inc., Dept. PVP, 5421 Brier Ridge Rd., McLean, Va.

COLLOIDAL SILICA
For Water Base Paints

Nalcoag, a colloidal silica, is now available.

May be used to retard aging, provide resistance to soiling, and impart high thermal stability to fireproof paints. Use as a wetting and flatting agent is proposed.

In addition the company says the characteristics of the product indicate that coating a surface with Nalcoag before painting will result in a smoother surface and better adherence of paint.

National Aluminate Corp., Dept. PVP, 6216 West 66th Place, Chicago 38, Ill.

CONTINUOUS BLENDER
Dry or Liquid-Dry Mixtures

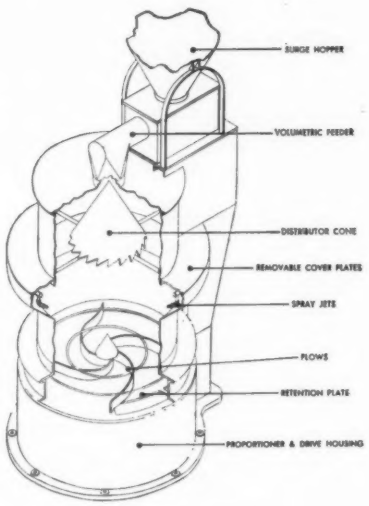
Continuous-flow blender has been developed that is claimed to accurately proportion, mix, blend, and discharge a wide range of dry materials. Also blends liquids with solids in precise quantities.

Materials to be treated or blended are fed proportionately into the blender, called Verticone, via controlled volumetric feeding equipment onto the apex of a cone. This cone is the first step in blending of solids as it causes the material to form a circular, falling curtain as it leaves the base periphery of the cone.

At the base of the cone, spray headers can be provided to disperse any desired liquid into the mixture in any proportions required. Liquid is sprayed on the blended dry material from both inside and outside the curtain as it falls onto a retention plate.

In applications where only solids are blended, effective and economical dust control can be provided by conditioning with Compound MR solution. Controlled wetting in the Verticone is achieved with as little as a fraction of one percent of moisture, or it may be precisely adjusted and metered to add any specific volume of moisture desired.

The complete unit with feeder can be supplied with a common



JOHNSON-MARCH

base and can be located indoors or out. Winterized equipment is available for year-round operation in areas where temperatures fall below freezing.

The Johnson-March Corp., Dust Control Engineers, Dept. PVP, 1724 Chestnut Street, Philadelphia 3, Pa.

CONVEYOR
Stationary or Portable Models

A time and labor saving device for lifting and dumping drums or bags has been announced. The unit is designed for low-cost batch loading of mixers, blenders, kettles, tanks and other process equipment.

Termed the Cesco Jr. Model DU, the conveyor lifts and dumps a variety of standard size drums. It can also be adapted to lift and discharge bags. The unit has broad application in industry wherever bulk materials are received.

Available in capacities to 400 pounds and dumping heights to 12 feet. Models are stationary or portable. Variations can be designed for other heights and capacities. Conveyors and Dumpers, Inc., Dept. PVP, Caldwell, N. J.

COPOLYMER EMULSION
Mechanical Stability

Production of a new borax stable polyvinyl acetate-dibutyl maleate copolymer emulsion has been announced.

Designated Resin D-243, the emulsion is said to be unique because it combines borax tolerance with a high degree of compatibility with organic solvents. The product has a particle size distribution of from 0.2—1.5. In addition, the resin is reported to have superior flow characteristics, excellent freeze-thaw and mechanical stability. Films cast from the new resin have the advantages usually associated with internal plasticization such as improved film forming characteristics and low temperature flexibility without the need for additional plasticization.

Resin D-243 is suggested particularly for use in adhesives, and also in textile finishing, as a cement additive, in paper coatings, surface coatings and as a beater additive in paper manufacture. Shawinigan Resins Corp., Dept. PVP, Box 2130, Springfield 2, Mass.

LEWIS-SHEPARD

CRATE HANDLING DEVICE
Palletless Handling

A crate handling attachment made to perform two separate func-

tions: one, handling equipment in cardboard cartons and the other handling equipment in cardboard wire bound crates with capacities up to 1500 lbs. has been developed.

With this attachment, cartoned material can be loaded, unloaded, transported and stacked without the use of pallets, forks or dunnage.

For handling cartons, a beveled angle at the top of the frame of the attachment fits under the folded-over cover of the carton. The side of the carton adjacent to the truck rests against a wood backing plate.

For handling open wire-bound crates, the attachment is equipped with two hooks which engage the crate under its top board. The hooks are adjustable both in width and height to fit practically any sized crate. The hooks swing out of the way when cartons are being handled.

Handling device is quickly detachable. It is hung on the truck carriage and is readily interchangeable with standard forks. The lifting hooks are quickly adjustable for most conventional width or height crate or cartons. Can be made specially in tandem to handle as many as four appliances at once. The open frame construction affords the operator optimum visibility.

Lewis-Shepard Products, Inc., Dept. R8-29, PVP, 125 Walnut St., Watertown 72, Mass.

CUP
Water-Vapor-Transmission

New type water-vapor-transmission cup has been developed.

This cup is reported to be very reliable and simple to use.

A gastight seal of the film specimen is obtained with the new cup. Two polyethylene gaskets keep the film in a gastight seal when the holding ring is tightened down, using only hand pressure on the screw top. The holding pins prevent the development of torsion tearing forces in the film sample during tightening of the screw top. Film samples, it is said, can be mounted rapidly and securely.

The water-vapor permeability is obtained by placing a desiccant, such as silica gel, calcium chloride or phosphorous pentoxide, in the cup before the specimen film is clamped in place. Measurements

GARDNER

are then made in the same manner as with all other water-vapor-transmission cups. The cup is placed in a constant-humidity chamber, then removed and weighed at intervals until the gain in weight per unit time becomes constant. When this equilibrium state is reached, the water-vapor-transmission may be calculated in grams of water transmitted through the film per 24 hours per square meter, or in any other convenient units to describe the specific permeability of a film to moisture.

Gardner Laboratory, Inc., Dept. PVP, Box 5728, Bethesda 14, Md.

CURING AGENTS
For Epoxy Resins

Longer pot life and low volatility are said to be among the advantages of three new dicarboxylic anhydride hardeners for epoxy resins.

The new anhydrides, Dodecenyl Succinic, Methyl Nadic (R) and Hexahydrophthalic, provide benefits when used for laminating compositions, potting, encapsulating, and impregnating electrical components. They are also claimed to be superior to previous curing agents in the preparation of tools and dies and industrial coatings.

New anhydride hardeners impart long pot life to the resin mixtures, blend easily with both solid and liquid epoxy and give low-peak exotherms and low viscosity to room temperature mixtures. They also produce resins with physical properties superior to amine cured systems and provide cured resins of very low weight-loss at elevated temperatures.

National Aniline Division, Dept. PVP, 40 Rector Street, New York 6, N. Y.

DEFOAMERS
General Use

Development of three new defoamers for general industry and paint systems was announced.

The new products, all designed for general defoaming use, were also found to be especially effective for specific industries. "Eldofoam 2892" and "Eldofoam 1961," both non-ionic and completely stable, were found to be unusually successful for various latex systems such as butadiene, styrene, PVA and acrylic. "Eldofoam 3503," a special product developed for general defoaming use in latex systems, was also found to be especially effective

Foremost Food and Chemical, Dept. PVP, Oakland, Cal.

DICARBOXYLIC ANHYDRIDE
For Epoxy Curing

Beta-S, a new liquid dicarboxylic anhydride has been introduced in development quantities.

Testing shows the product to be particularly useful in curing epoxy resins. Beta-S, dimethyl substituted butenyl tetrahydro phthalic anhydride has a combination of double bond and anhydride functionality indicating potential as an intermediate for preparing surfactants, lubricant additives, corrosion inhibitors, and dyes.

As a curing agent, Beta-S is claimed to be suitable for systems used in impregnating, potting, casting, laminating, tooling and coatings. Physical testing shows epoxy systems cured with the anhydride to possess high compressive and flexural strengths, low power factor characteristics and low shrinkage. Low exotherm evidenced by the anhydride in casting operations is conducive to plant safety.

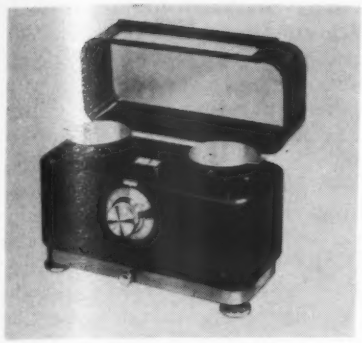
The low density offered by Beta-S cured epoxies, 10% lower than comparable systems, is expected to promote material economy in potting and casting.

The chemistry of Beta-S suggests its use as a valuable intermediate. Readily reactive, the product will undergo hydrolysis, esterification, amidation, imide formulation, reduction, and aromatization.

Market Development Department, Heyden Newport Chemical Corp., Dept. PVP, 342 Madison Avenue, New York 17, N. Y.

DIAL BALANCE
120 Gram Capacity

Weighings, it is claimed, can be made in 1/3 of the time with the



TORSION BALANCE

new dial balance now available. Its capacity is 120 grams.

The new design features a simple graduated dial which can be turned without arresting the oil-damped balance, replacing the time-consuming "cut-and-try" procedure. This means that the time consuming portion of the weighting (below one gram) literally can be "dialed in" in 1/3 the time.

The new dial mechanism is said to retain its original accuracy after more than a million weighings.

The new dial is graduated from zero to one gram by 10 milligram (.01) graduations. The sensibility reciprocal will be 10 milligrams. In other words, 10 milligrams will move the rest point one index division. The balance is oil-damped to minimize oscillation and greatly facilitates the weighing operation.

The metal case has a corrosion resistant gray finish constructed to exclude dust and chemicals. The hinged lid is 2-¾ inches high with a glass front and top. The unit measures 11½ x 6 x 8¼ inches.

Torsion Balance Co., Dept. PVP, Clifton, N. J.

DIEWHEEL

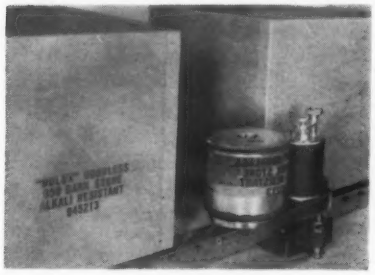
Removes Lines Quickly

A "zip-change" printing drum or diewheel that permit entire lines of copy to be removed and replaced in seconds, has been developed for use in the firm's recently re-designed line of "Rolacoder" case-marking attachments.

The new diewheel, which is designed to accomodate "zip-change" brassback rubber dies, also allows any individual line to be changed without disturbing other lines and affords positive assurance against type shifting or falling out of place.

This development makes it practical to use an automatic marker for addressing shipping cases as well as for other applications where one or more lines of copy must be changed frequently.

The "zip-change" diewheel has a vertical line of fixed posts at one position and a line of spring-loaded posts at another position. Dies, equipped with brass eyelet fasteners at both ends, are simply slipped on or off the posts as desired. The "zip-change" dies are made in logotypes of complete wordings, as specified by the user,



GOTTSCHO

or with a channeled face designed to receive individual letters or figures. Both types of dies may be combined on the diewheel to provide maximum versatility.

Adolph Gottscho, Inc., c/o David E. Rothschild, Dept. PVP, 222 E. 46th St., New York 17, N. Y.

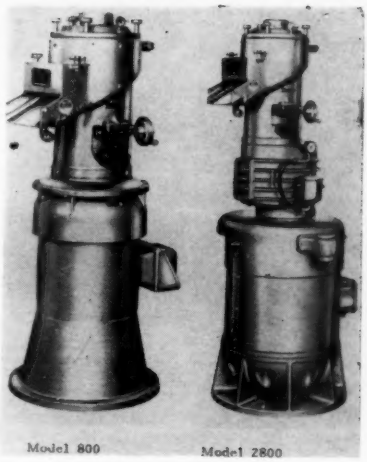
DISPERSION MILLS

New Spindle Assembly

Two new mill series with increased stone sizes and peripheral speeds now give a 30—50% gain in capacity over former models, according to the manufacturer.

New model series 800 and 2800 utilize the largest high speed carborundum stones yet developed, eight inches in diameter. The consequent higher peripheral speeds thus make the volume increases possible. In the model 800, the peripheral speed at 3600 rpm (motor operating on 60 cycle) is 7550 fpm; in the model 2800, the peripheral speed at 5400 rpm (motor operating on 60 cycle) is 11,350 fpm. The 800 series mills are equipped with 25 H/P motors and the 2800 series mills are equipped with 50 H/P motors.

The most startling feature of the new line of mills is said to be the new spindle assembly with which each will be provided. This all new, more rugged assembly is



MOREHOUSE-COWLES

1-3/8" larger than assemblies previously available, seats on a tapered spline on the shaft giving more positive alignment and the top bearing has a full uninterrupted seat, as opposed to the old spindle seat in which the bearing seated on the spline. This new top bearing has an 82% higher thrust rating over top bearings previously employed, and is the only bearing, of the two used in each spindle assembly, that requires lubrication.

The stone plate, which carries the rotating stone, has newly designed labyrinths, including tapered surfaces and utilizes a "screw effect" to wind materials out of the labyrinths thus eliminating chance of contaminates getting into the bearings below. The assembly is further protected from contaminates by "O" Rings and grease seals which keep foreign materials out and grease in.

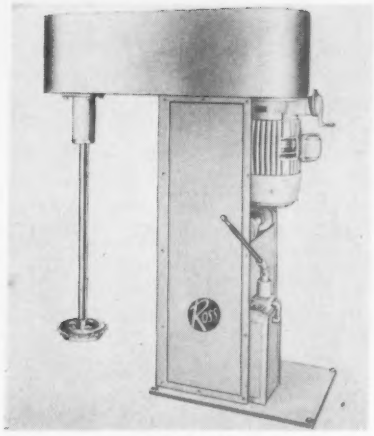
Morehouse-Cowles, Inc., Dept. PVP, 1150 San Fernando Rd., Los Angeles 65, Cal.

DISSOLVER

Multiple Action Impeller

A high speed dissolver or disperser has been developed.

The machine features a specially designed multiple action impeller or millhead which effectively mixes, disperses, dissolves, emulsifies and deagglomerates most types of liquid, paste or heavy paste materials. The material is drawn down into the millhead by specially pitched impeller vanes and thrown at high speed with tremendous impact against special baffles to break down lumps or agglomerates. Further abrasive action occurs as ma-



CHARLES ROSS

terial is pumped through a very narrow orifice with spaced disperser bars. The third separate force the material is subjected to is the sawtooth cutting or shearing action of the specially set teeth spaced around the outer periphery of the millhead, and lastly the material is jetted out laterally in a very thin stream at speeds up to 120 M.P.H.

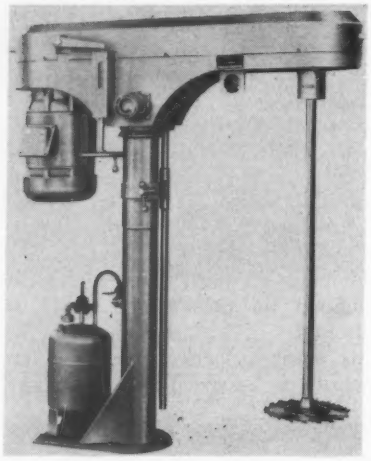
The disperser can be used in any size tanks or containers from standard 55-gallon steel drums up to tanks measuring 40″ diameter by 45″ deep, and millhead is readily raised out of the tank by simple hydraulic jacking unit. Variable speed is provided for setting millhead speeds anywhere between 2059 FPM and 10323 FPM as required. Stainless steel shaft and millhead are standard, and millhead can be readily cleaned.

Charles Ross & Son Co., Dept. PVP, 148 Classon Ave., Brooklyn 5, N. Y.

DISSOLVER
Variable Pitch Diameter

New dissolver models for mixing, dispersing and deagglomerating, feature a new, unique power transmission system capable of delivering over 90% of motor horsepower to the impeller even at lowest speeds.

Designated as the "MPD" (Maximum Power Delivery) transmission system, the unit employs variable pitch diameter pulleys and belts to maintain maximum available horsepower at any selected speeds. Speed may be changed during or between batches without appreciable loss of horsepower capacity.



MOREHOUSE-COWLES

Maximum horsepower can be delivered over a full range of speeds regardless of changing physical characteristics, such as viscosities, in materials being processed.

Motor size is determined in relation to batch size, impeller size and speeds required for products involved. This determination assures important savings through the use of the proper size motor and consequent savings in first cost and power consumption.

Morehouse-Cowles, Inc., Dept. PVP, 1150 San Fernando Rd., Los Angeles 65, Cal.

DRIVE AGITATORS
Maximum Rigidity

A complete line of heavy duty vertical drive agitators is now available which incorporates among other features, an output shaft bearing assembly designed to provide maximum rigidity and minimum shaft deflection, which assures constant shaft alignment under all loading conditions.

This exclusive development by U. S. Mixer Division of Stockdale Engineering Company, has been engineered to overcome many of the inadequacies commonly found in conventional mixing equipment. Run-out or deflection at the center of the seal or stuffing box is controlled within close limits so as to virtually eliminate wear at this critical point. As a result, these units are as well suited for the more difficult applications requiring operation under pressure or where noxious or corrosive fumes may be contained, as for ordinary open tank agitation. Minimum shaft deflection and attendant long-life sealing also assures peak performance for long periods of time with practically no downtime for stuffing box maintenance or seal replacement. Packaged seal cartridges are available to operate at pressures up to 2500 psi, and specially cooled seal cartridges are also available. The cartridge type mechanical seal can be changed without disturbing the drive or the impeller shaft. U. S. Mixer, Division of Stockdale Engineering Co., Dept. PVP, Haddonfield, N. J.

DRUM CLEANER
Completely Automatic

Drumatic, a completely automatic drum cleaner, capable of cleaning 1500 55 gal. drums per eight-hr. shift, is now available.

The Drumatic consists of a long bath tank containing caustic solution which loosens outside coatings and inside residues. Drums revolve in solution while moving forward to batter of brushes which clean both ends and sides. Built-in lift fork then deposits drums cleaned to bare metal, on rinse rack.

This automatic machine, the makers claim, easily cuts drum cleaning cost in half. With it one attendant cleans as many drums as 12 men with commonly used methods.

Drumatic Corp., Dept. PVP, P.O. Box 3356, Rincon Annex, San Francisco, Calif.

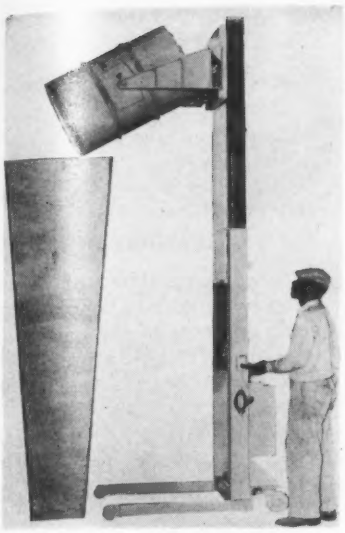
DRUM HANDLER
No Springs

New drum handler is designed to pick up every type of drum. According to the manufacturer, drums can be securely gripped, one or two at a time. The heavier the drum—the tighter the grip. Drums are released only when they are set down.

The gripping head consists of two hardened jaws which grip the bead. No springs are used.

Mounted on the carriage, slipped on the forks or over the lip of a shovel, the new handler can be used for either constant or intermittent drum handling. It is said to eliminate manual handling of drums.

Little Giant Products, Inc., Dept. PVP, 1597 N. E. Adams St., Peoria, Ill.



SPECIALTY MACHINERY

DRUM HANDLERS

Has Telescoping Mast

The addition of powered high-lift models to the firm's line of all purpose drum handlers has been announced.

These models employ a telescoping mast which permits a low, close height for easy manuevering.

The drum handler is said to be designed to make it fast, easy, and safe for one man to handle, raise, lower, and rotate drums.

Model 796, which will pick up a drum from either a horizontal or vertical position, will elevate up to 800 pounds to a height of 8 feet above the floor with the drum vertical or 8' 7" with the drum horizontal.

The Model 796 drum handler is available in a choice of three drives: battery powered with built in charger; air motor; and explosion proof A. C. electric—all of which provide speeds of 16 FPM.

A variety of accessories is available to extend the utility of the unit. These include fibre drum jaws, bag adaptors, power tipping attachments, and spark-proof wheels.

Specialty Machinery Corp., Dept. PVP, 50 Roanoke Ave., Newark 5, N. J.

DRUM HANDLING ATTACHMENT

Eliminates Pallets & Dunnage

"Liftomatic" drum handling attachment that can be used interchangeably with the firm's line of electric fork trucks has been developed.

LEWIS-SHEPARD

The "Liftomatic" drum handling attachment is a mechanical unit claimed to engage, transport, place and tier any conventional type drum without the use of pallets or dunnage. Because the clamping mechanism is adjustable from 35" to 14", any size drum regardless of height, diameter, head or rim size can be handled. The jaws, too, can operate perfectly on steel, removable lid, fiber or light guage (disposable) metal drums either opened or closed.

No additional controls are necessary since it is a mechanical unit. The clamping mechanism consists of an outer and inner housing—the inner housing is spring actuated and has an upper and lower jaw. The fork truck operator merely approaches the drum; the inner housing is pressed in until the outer housing touches the side of the drum. Then by raising the carriage the jaws of the Liftomatic automatically grip the rim of the drum and is ready for transporting. To remove the drum, operator lowers drum to the resting surface and continues to lower truck carriage until both jaws have retracted.

The unit is quickly detachable. One man can attach in 2-3 minutes without the use of tools. There are no nuts or bolts.

Lewis-Shepard Products, Inc., Dept. R8-31-PVP, 125 Walnut Street, Watertown, Mass.

DRUM LIFTING HOOK

For Volatile Liquids

A new #41M drum lifting hook for handling drums of volatile liquids in hazardous areas has been made available.

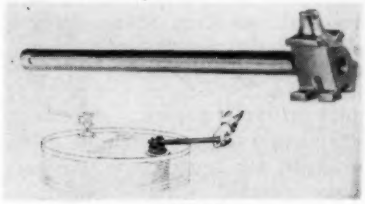
MORSE

The cast hook, made of non sparking manganese bronze, is connected to a large 3" diameter bronze ring with double 7/16" diameter brass rods.

The non-sparking hook is attached to any type of hoist by means of a 3" diameter ring and the hooks are engaged over each end of the drum for safe movement. The hooks have clearance for a ¾" rim and will accommodate standard 55 gallon drums as well as any drum up to 34" in length.

The capacity of this drum lifting hook is 1000 lbs.

Morse Manufacturing Co., Inc., Dept. PVP, 727 W. Manlius St., East Syracuse, N. Y.



MORSE

DRUM PLUG WRENCH

7 Projections—5 Slots

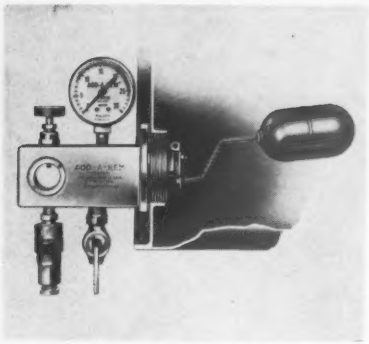
A drum plug wrench which will fit over 95% of all popular bungs on the market has been announced.

The wrench is available in safety bronze as well as special steel alloy. Seven projections and five slots conform to the various bungs.

Product is said to be well balanced. A 16" steel tube handle gives adequate leverage to open either the ¾" or 2" bung.

The Model #61 wrench is used to remove bungs from non-volatile fluids and the Model #61M bronze non-sparking wrench is designed for hazardous areas. Either model is now available.

Morse Manufacturing Co., Inc., Dept. PVP, 727 West Manlius St., East Syracuse, N. Y.



STERLING E. NORCROSS

DRUM PROPORTIONER
Precise Metering Valve

A non-electric, direct-from-drum proportioner named "Pour-Portioner" has been announced.

Fitting into the 2" head bung of all steel shipping drums thru 55 gallons, this compact, pumpless proportioner either separately or simultaneously directly meters light to viscous chemicals at drops per hour thru sight glass, or batch pours thru built-in faucet provision.

Feeder operates by gravity feed with light liquids, or by available vacuum, pump suction or compressed air for very viscous flow. Automatic "empty" indicator gauge and air-tite flow shutoff are provided.

Unit is maintenance free and snap-type coupling makes possible quick drum changing. Accessory fittings said to permit remote drum location for many applications where precise, direct-from-drum metered feeding is required or desirable.

Sterling E. Norcross Companies, Dept. PVP, 19 Osborne St., Bloomfield, N. J.

DRUM TAP
3-Slide Cutoff

A dripless retracting drum tap that employs a 3-slide guillotine cutoff to assure positive, drip-free operation has been announced.

Available for installation by the drum maker or by the processor at time of filling, the new tap is ready for instant use by the consignee. This is said to eliminate wasted time presently required by the user to reverse conventional drum spigots from storing to pouring position.

The tap is opened by a slight turn and pulling. In extended position, liquid flows freely through a full-opening pouring port in the tap. Shut-off is accomplished by pushing the tap back into the drum and turning clockwise to locked position. Dripping or leaking is not possible in this position. In "off" position, the unit is flush with the drum head so that no projection exists to cause accidents, the manufacturer points out. As the spout is positively dripless, a cleaner, safer, more sanitary drum rack area is assured.

HADCO

The tap is available in two models. One style can be embossed into the head by the drum manufacturer. A threaded model that fits standard ¾" pipe-size drum openings is available for installation by the processor during the filling operation, placing it in the ¾" bung for the convenience of his customers. In either instance, the retracting tap is claimed to eliminate need for conventional cast iron spigots ordinarily shipped inside the drum.

Hadco Corp., Dept. PVP, 2705 Detroit Ave., Cleveland, Ohio.

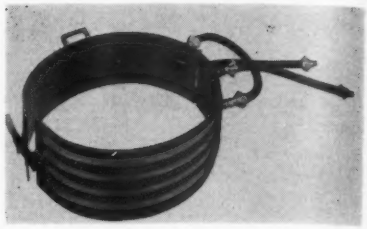
DRUM-WARMER
For 55-Gallon Drums

A device for applying heating or cooling to conventional 55-gallon steel drums is now being marketed.

The new drum warmer consists of a single-embossed Tranter "Platecoil" with quick-acting clamp and flexible connections to permit rapid change from one drum to another or changing the location on an individual drum. Insulated handles are included for safe, easy handling of the drum warmer.

The flexible connections can be connected to steam lines, hot or cold water or some other refrigeration source to add or withdraw heat from the contents of the barrel.

The new device is expected to



TRANTER

simplify storage problems of certain types of material and enable users to bring contents of the barrels to the required temperature more quickly to ease processing schedule problems.

Platecoil Division, Tranter Manufacturing, Inc., Dept. PVP, 735 E. Hazel St., Lansing 9, Mich.

DRUM WARMER
Thermostatically Controlled

Over 100 standard combinations of sizes and models of automatic drum warmers to keep drums at

PALMER

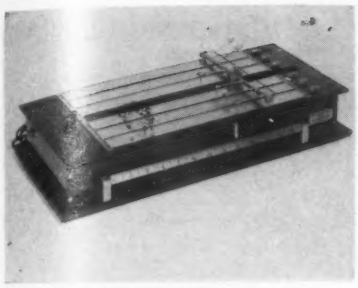
proper temperature automatically has been made available. Customer can specify the model which fits his power supply, his temperature requirements and his processing methods.

Designed for hard usage in industrial processing, yet engineered to eliminate any possibility of hot spots, it can safely be used for all viscous materials such as tar, asphalt, etc., or the most sensitive materials.

Harold L. Palmer Co., Dept. 154-PVP, 28625 Grand River Ave., Farmington, Mich.

DRYING RECORDER
To Measure Drying Time

A drying recorder device, by which scientifically precise measure-



EASTERN PRECISION

ment of drying time of any paint, varnish, lacquer, enamel or other chemical products, is now available.

This instrument is portable and compact enough to be used with auxiliary equipment to vary the atmospheric conditions under which drying takes place. To measure the drying time, films of the materials to be tested are applied with a specially designed film coating gage to one and up to six of the metal specimen strips available which are then placed on the table of the recorder. On each of the strips coated, a hemispheric needle is brought to bear down by means of a movable carriage to which a time indicator is attached. After indicator is brought to zero on the time scale, a 110 v. synchronous motor draws the carriage along the length of the strips, making tracks in the film being evaluated. Through the use of a three speed gearbox, the total travel of the needles can be set to occur in 8, 16, or 24 hours so that the drying time of the quick and slow drying materials alike can be more accurately determined.

Different stages of the drying process are registered and data on other physical properties of the film, i. e. adhesion through drying, and tendency to wrinkle are recorded.

Eastern Precision Tool & Gage Co., Dept. PVP, 451 Lehigh Ave., Union, N. J.

DUST COLLECTOR

For Large Bulky Volumes

High-efficiency cyclone separator, operating in the 2,000-3,000 cfm range, has been introduced.

Designated Model No. 24, the new cyclone is specially designed to handle large volumes of bulky dust. Its new self-cleaning radial fan design is said to give high performance at low horsepower requirements. The 24 FM model is designed for outside exhaust. When it is desired to save heat and recirculate cleaned air, FB models equipped with cloth after-filter bags are also available.

In laboratory tests, the model has separated by weight 99.8% of steel grindings, 99.5% of sawdust and 84% of fine corn starch particles.

Operated by a 7½ horsepower motor, the No. 24 has a 10-inch inlet and 12-inch outlet. The standard series 24 base contains a convenient pull-out drawer with 9 cubic feet storage capacity.

Torit Manufacturing Company, Dept. KP-PVP, Walnut and Exchange Streets, St. Paul, Minn.

ELECTRIC FURNACE

Multi-Purpose

Type 2100 Thermolyne top-loading electric furnace, a multi-purpose unit, is said to be adaptable for use as salt bath, melting, vertical muffle, or crucible furnace.

Its many recommended laboratory and shop uses encompass investigative and pilot runs as well as short run production and the heat treating of small parts. The maximum chamber temperature for intermittent operation is 1900° F.

The basic unit includes the hexagonal furnace (115 or 230 volts, chamber 5 5/8" Dia. x 11½" deep), stainless steel pot (6½" Dia. x 7½" deep) with cover and convenient lifting handle, and thermocouple in protection tube. Optional maximum-use accessories include a refractory ladle, refractory chamber liner, and insulated cover.

The furnace case is of heavy-gauge welded and braced steel construction and is finished in corrosion and heat-resistant enamel. Three separate and distinct types of insulation are so utilized as to minimize heat loss and maintain even temperatures. Heavy gauge nickel chromium heating coils held in refractory supports line the chamber uniformly.

Thermo Electric Mfg. Co., Dept. PVP, 559 Huff St. Dubuque, Iowa.

ELECTRIC TRUCK

Narrow Aisle Stacking

A reach-type, narrow aisle electric fork truck, 38 inches wide, has been introduced.

CLARK EQUIPMENT

Named the "NR-40," the truck's features include power brakes which are hand-operated rather than foot-operated, power steering, dual operating controls, two wheel drive and automatic fork tilt. The truck's capacity is 4000 lbs. at 24 inch load center.

Designed to operate in confined areas, the "NR-40" can stack 48 inch long loads at right angles in a seven foot wide aisle. Top forward speed with full load is six mph. The truck has six speeds in each direction.

A forward tilting feature automatically tilts forks forward two degrees at the extreme bottom of the fork lowering motion. When forks are raised they automatically return to a horizontal position. An optional back-tilting feature automatically tilts forks back three inches when carrying a load.

Specifications of the "NR-40" are: length, from rear of load, 36 inches; overall width, 38 inches; height to top of overhead guard, 83 inches; wheelbase, 58 inches; weight, 5500 lbs., including standard battery having a rating of 13.3 kilowatt hours.

Industrial Truck Division, Clark Equipment Company, Dept. PVP, Battle Creek, Mich.

ELECTRON MICROSCOPE

Magnifies Two Million Times

The Norelco EM 200 electron microscope, an instrument that provides 200,000X direct magnification and up to 2,000,000X magnification by photographic methods, has been announced.

Resolving power of 10 Angstroms or better is guaranteed. The instrument provides 1400 to 200,

000X direct magnification for visual observation on the screen or for photographic recordings on 3¼" x 4" plates. Such photos can be easily enlarged to 2,000,000X magnification. Direct magnifications of 700 to 100,000X can be made on 35mm film and 100X can be handled with an adaptor. Direct magnifications are indicated or recorded with an accuracy of plus or minus 5% and the full range is obtained with a single set of pole pieces.

Consisting of a desk-type console and auxiliary cabinet, the EM 200 utilizes accelerating voltages of 40, 60, 80 and 100 Kv (Kilovolts) which may be charged during operation. The desk console supports the column and houses the controls and pumping system. An auxiliary cabinet encloses the power supply and stabilization units.

Electron optical system includes a vertical column having six electromagnetic lenses: double condenser, objective, two intermediate, and projector. The double condenser lens has an independent compensator and easily adjustable electromagnetic centering device. The minimum attainable beam diameter is 1-2 micron on the specimen. Wide field scanning permits rapid specimen examination at 300X magnification.

The EM 200 electron microscope desk is 47 in. wide, 42 in. high and 32½ in. deep. Column and high tension cable are 53½ in. high. Auxilary cabinet is 43½ in. wide, 75 in. high and 24 in. deep. The instrument can be operated on single phase, 50 or 60 cycle power supplies with 110 to 440 volt ratings. Energy consumption is approximately 3.5 Kva.

Instruments Division, Philips Electronics, Inc., 750 South Fulton Ave., Mount Vernon, N. Y.

ENVIRONMENTAL CABINET
For Varied Conditions Testing

A walk-in type environmental cabinet has been made available.

The unit was designed to enable the firm to test components under a wide range of temperatures and humidity conditions.

The temperature humidity cabinet contains 216 cubic feet of area. It is constructed entirely of metal eliminating any drop in efficiency caused by deterioration of wooden parts. Stainless steel exterior and Monel metal interior is fully resistant to corrosion. Noteworthy, too, is the unique, angled inside ceiling which prevents moisture that may collect there from dropping into test specimens. Vaporproof light has external switch. Dual blowers give even air flow throughout the chamber.

The double-walled door and extra Fibreglas insulation used throughout are designed to maintain variable temperature and humidity conditions, approximating plus or minus 2 degrees accuracy. Door is equipped with Thermopane window and special silicone gaskets. Actual range of temperature is from 0°F. to 200°F. and humidities of 15% to 98%. Oversized components are used to provide performance in excess of specifications.

The cabinet incorporates its own humidity steam generator complete with recorder-controller programmer for recording and controlling varying temperatures and humidities over a pre-determined period. The special dual controls are also designed to anticipate load fluctuations more rapidly than with regular control systems.

Hudson Bay Co., Division of Labline, Inc., Dept. PVP, 3080-82 West Grand Ave., Chicago 22, Ill.

ESTERIFIED SHELLAC
Wax-Free

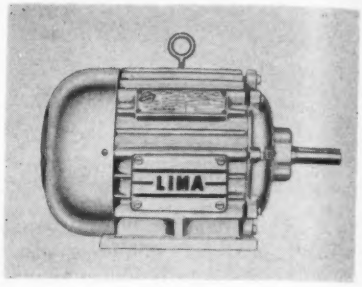
The availability of ES-45, described as an esterified and modified wax-free refined shellac, has been announced.

The new ester is said to have been especially treated and processed for use with nitrocellulose, ethyl cellulose, vinyls, alkyds, maleics, phenolics, and numerous other film-forming materials. Its properties have enlarged its formulation range in the coatings and ink industries. Among the claimed advantages achieved with formulations containing ES-45 are improvements in gloss, flexibility, adhesion, leveling, and ultraviolet light resistance.

ES-45 has excellent color and non-corrosive stabilities. Its extremely lighter color adds to its possibilities of additional end uses.

ES-45 has a high degree of tolerance for hydrocarbons, ketones and ester solvents. It is used as a film former and plasticizer and yet yields films which set up rapidly to a tack free stage.

The Mantrose Corp., Dept. PVP, 1 Hanson Place, Brooklyn, N. Y.



LIMA

EXPLOSION-PROOF MOTOR
One to Forty HP

EX explosion-proof motors incorporating the latest technical advances, are Underwriters' Laboratories Approved for Class I, Group D and Class II Groups F and G Service.

Frame assignments accommodate standard ratings of 1 through 40 HP, either 3 or 2 phase, in all commercial frequencies and voltages below 600.

It is recommended for locations where hazardous gasoline, petroleum, naphtha, alcohols, acetone, lacquer solvent vapors and natural gas are present.

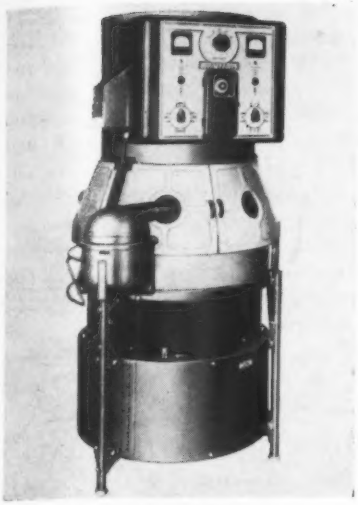
EX motor frames incorporate deep, integrally cast fins that provide extra cooling surface for rapid heat dissipation. Design eliminates all corners, pockets and air passages which could become clogged and retard cooling and motor efficiency. A specially designed external fan forces air at high velocity over the outside of the motor to provide constant cooling and a self-cleaning action.

The Lima Electric Motor Co., Inc., Mr. C. D. Byran, Sales Promotion Manager, Dept. 314, PVP, Lima, Ohio.

FADING TESTER
With Atomizer & Meter

Fade-Ometer, Model FDA-RC, has been introduced.

This Fade-Ometer is equipped with an electrically operated atomizer and cycle meter. This permits it to be operated either under conditions simulating the cycling effect and high humidity conditions encountered in the daylight exposure method or under conditions



ATLAS ELECTRIC

which produce good correlation with the sunlight exposure method where samples are exposed to sunlight between 9 a. m. and 3 p. m.

Atlas Electric Devices Co., Dept. PVP, 4114 N. Ravenswood Ave., Chicago 13, Ill.

FATTY ACID
Color Stability

A new tall oil fatty acid having much lighter and improved color stability characteristics was announced.

Arizona is a jointly-owned subsidiary of American Cyanamid Company and International Paper Company.

The product, Acintol FA 1 Special, is expected to find initial application in surface coating vehicles, liquid soap products, synthetic detergents and plasticizers.

Architectural and industrial enamels formulated with this product show excellent initial color and resistance to yellowing in addition to maintaining the high gloss characteristics that can be obtained in long to short oil length alkyd vehicles.

Liquid soap products, in addition to having improved color characteristics, can be made to higher soap solids content through use of this product.

The exceptional color stability of Acintol FA 1 Special will enable manufacturers to control the formulation and production of finished products more closely. Arizona Chemical Co., Dept. PVP, 30 Rockefeller Plaza, New York 20, N. Y.

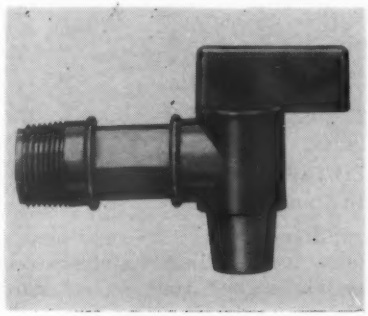
FATTY NITROGEN
Versatile Intermediates

The commercial availability of 24 new fatty nitrogen chemicals have been announced.

The new products include four primary, five secondary, and three tertiary fatty amines (trademarked Alamines); four fatty trimethyl ammonium chlorides, five difatty dimethyl ammonium chlorides, one trifatty methyl ammonium chloride, and two quaternized fatty diamines.

The new chemicals are said to be versatile chemical intermediates possessing properties such as solubility in a wide variety of polar and non-polar solvents, surface activity, base exchange, and anti-static activity.

General Mills, Dept. PVP, Kankakee, Ill.



MULTI-METER

FAUCET
Polyethylene Type

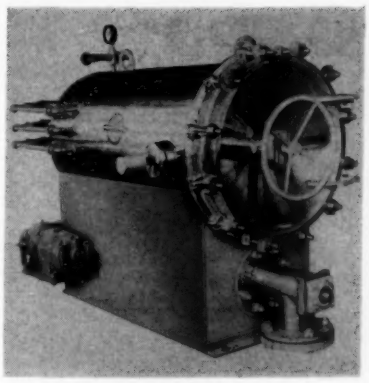
Polyethylene faucet, called "Flo-Rite," has been introduced. The new "Flo-Rite" faucet is molded of a new type polyethylene.

Designed to fit all ¾" standard drum openings, this full-size new faucet is said to give satisfactory service in extreme cold or temperature up to 140° F. without breaking, softening, or bending.

Inside diameter of 5/8" barrel and spout provides largest flow possible from ¾" drum opening. Instant full flow is obtained by a quarter turn of the handle and patented vertical ribs inside spout eliminates dribble or spit.

The elimination of opening and closing threads in the faucet eliminates all possibility of leakage.

Multi-Meter Corp., Dept. PVP, P. O. Box 6594, 1041 Custer Drive, Toledo 12, Ohio.



SPARKLER

FILTER
Pressure Type

A new type diatomite filter that combines the cake stability of a horizontal plate with dry cake automatic discharge has been made available.

This filter, known as the Model HR, is a totally enclosed pressure type that can be cleaned with complete cake removal without opening the filter. The plates are precoated and operate in a horizontal position; this assures cake stability without danger of cracking or slipping. Individual plate shut-off valve and sight glasses make it possible to blow the cake completely dry even with a limited supply of air or gas. The plates are then mechanically rotated to a vertical position, and a tapping on the external agitator bar will knock off the cake, or a vibrator can be used.

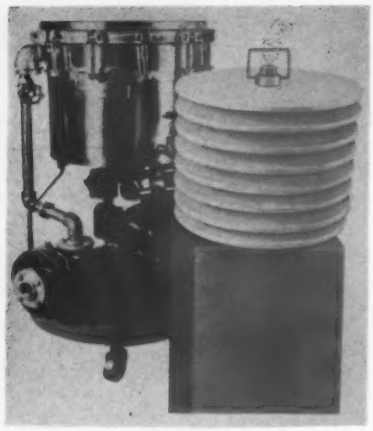
A screw conveyor removes the spent cake as a dry powder. Complete cleaning of the plates is performed without opening the filter. This filter can be furnished to operate completely automatically with electronic controls.

Sparkler Manufacturing Co. Dept. PVP, Mundelein, Ill.

FILTER CARTRIDGE
Easier Cleaning

New type of filter plate called the "Wash-Off" cartridge for use in the firm's standard horizontal plate filters has been announced.

These "Wash-Off" plates are assembled as a removable cartridge similar to the standard horizontal plate type, but when removed for cleaning it is not necessary to disassemble each plate to remove the spent cake and filter paper for replacement. The firm reports



SPARKLER

that the complete plate cartridge can be cleaned as a unit and returned to the tank for use in a fraction of the time required to clean individual plates.

New filters can be supplied equipped with the new "Wash-Off" plate cartridge or the cartridge only can be furnished for existing horizontal plate filter tanks.

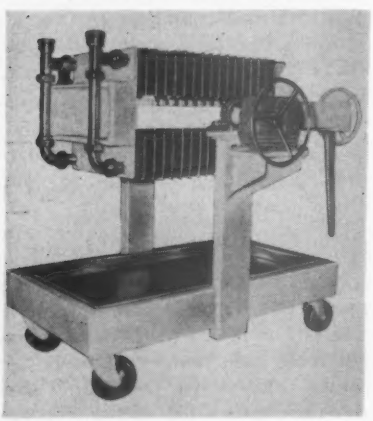
Sparkler Manufacturing Co., Dept. PVP, Mundelein, Ill.

FILTER PRESS
Vertical & Horizontal Position

Filter press is now available to the processing industries for uninterrupted filtering operation. Filter cake will not fall away from plates during operation, even with a pressure drop to zero.

Unit is designed to operate in a vertical position and is equipped with worm gear for turning to a horizontal position for cleaning and loading. Filter plates are 18″ x 18″ with stainless steel filter media supports and screen backing

CONSOLIDATED SIPHON

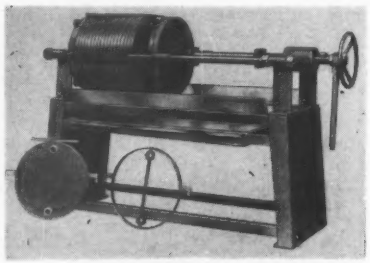


plates. Space can be specified for 1½″, 2″ or 3″ cake.

Filteration surface is furnished from 15 sq. ft. to 100 sq. ft., with from 2 to 35 plates. Capacity rating in gpm is dependent upon the type of liquid being filtered and number of filter plates being used.

Machine is furnished with heavy duty ratchet sealing attachment, removable drip tray, and precision ground surfaces to prevent leakage. Filter media may be of paper, cloth or other material dependent upon the processing operation.

Terriss Division, Consolidated Siphon Supply Co., Inc., Dept. PVP, 22 Wooster St., New York 13, N. Y.



STAR

FILTER PRESS
In Standard Sizes

Filter presses are completely fabricated in all the stainless steels and in carbon steel, in standard sizes from 12 to 42 inches in diameter. All surfaces on both standard and high pressure models are precision machined to give smooth, gasket-like sealing surfaces, the manufacturer says.

Other features cited by the manufacturer include: lighter weight plates and frames, ease of cleaning, pressures to fit specified requirements, and a cost reportedly less than cast machines. Star Tank and Filter Corp., Dept. PVP, 875 Edgewater Rd., New York 59, N. Y.

FLUORESCENT PIGMENTS
Greater Brightness

A new line of Hi-Viz fluorescent pigments is now available.

Said to be laboratory and field tested for many months. Finer and more uniform particle size and increased resistance to solvents and plasticizers claimed.

Eight brilliant colors are available: Pink, Red-Orange, Green, Yellow-Orange, Red, Lemon-Yellow, Cerise-Red and Gold-Yellow. Company also formulates Hi-Viz pigments in Red-Orange and Yellow-Orange. The Red-Orange and the Yellow-Orange are used to make coatings meeting requirements of MIL-P-21563 (AER) and MIL-P-21600 (AER).

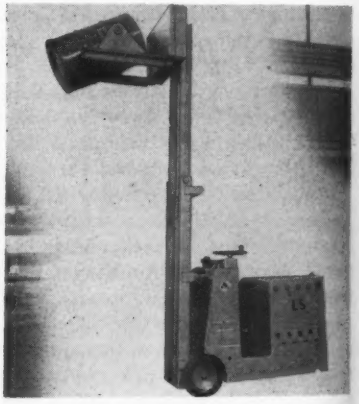
Pigments may be used, for toning non-fluorescent colors to produce new and brighter shades of regular paint lines. Hi-Viz pigments are said to be compatible with most vehicles.

Lawter Chemicals, Inc., Dept. PVP, 3550 Touhy Avenue, Chicago 45, Ill.

FORK TRUCK ATTACHMENT
Operator Controlled

A fork truck attachment that stacks, transports and dumps barrels and drums is now offered.

This attachment is said to add tremendous versatility to any fork truck. It not only handles wooden barrels and steel or fibre drums through clamping pressure but also dumps their contents by hydraulic tilting action. The objects handled can vary from 18″ to 26″ in diameter and be tilted up to 180° forward for dumping.



LEWIS-SHEPARD

All of the operations—clamping, rotating, lifting, lowering and tilting—are controlled by the operator from his driving position.

The attachment can be placed on any of the L-S spacemaster electric fork trucks or jackstacker "Walkie" units.

Lewis-Shepard Products, Inc., 125 Walnut St., Dept. R9-3- PVP, Watertown 72, Mass.

FRAGRANCES
Long Life

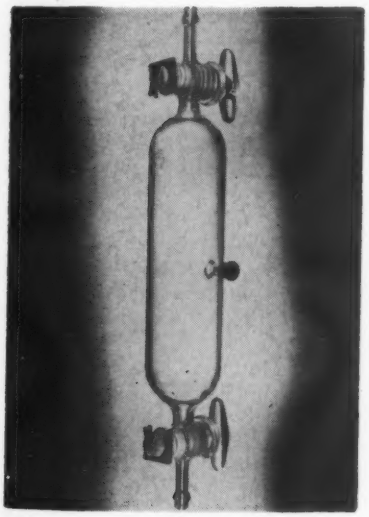
Fragrances with a life of 2 to 5 years after application can be easily

imparted to paint formulations with the aid of patented odor-retentive compounds.

Described as saponified derivatives of natural essential perfume oils, the new compounds have the unique feature of combining a relatively low initial emission of the fragrance and an extraordinarily long fragrance life. This is in sharp contrast to the action of essential oils which often emit an objectionably strong initial odor, with the effect rapidly diminishing within a few days.

The new compounds, which are very light in color and crystalline in form, are completely soluble in any organic solvent in use today. They are completely compatible and miscible with all of the pigments, oils, resins and other ingredients used in the formulation of surface coatings. Incorporation in existing paint formulations is merely a matter of adding the proper proportions of the odor-retentive chemical; no change in production process is involved.

Tyrex Drug and Chemical Corporation, Dept. PVP, 29 Pearl St., New York 4, N. Y.



FISHER

GAS SAMPLING TUBE
For Chromatography

"Side-Draw" chromatographic gas sampling tube has been made available.

The tube holds 250 ml and has stopcocks at both ends for filling with a gas sample in the usual way. A short side-arm, with a self-sealing rubber cap, does the rest. The operator merely thrusts the needle of the syringe through the cap, draws out as much gas as needed.

Fisher Scientific Co., Dept. PVP, 384 Fisher Building, Pittsburgh 19, Pa.

GEAR DRIVES
Reduced Vibration

A major improvement in gear drives for vertical fluid mixers is announced. The mixers are now available with gear drives having case hardened, precision-ground gears for greater load-carrying capacity and longer life, with reduced sound level and vibration.

The gearing has a degree of accuracy of tooth profile, profile spacing, and surface finish never available before. "Running-in" periods with resulting wear are eliminated. Dynamic load factors are reduced and gearing has a greater load-carrying capacity.

This new process also reduces gear noise to a point where normal conversation is possible even in multiple installations and confined areas. Vertical fluid mixers are made in standard models ranging from 1 hp to 200 hp and special models up to 500 hp. Mechanical seals or packed stuffing box may be specified and paddle or turbine-type impellers are available.

Philadelphia Gear Corp., Dept. PVP, 3620 "G" St., Philadelphia 34, Pa.

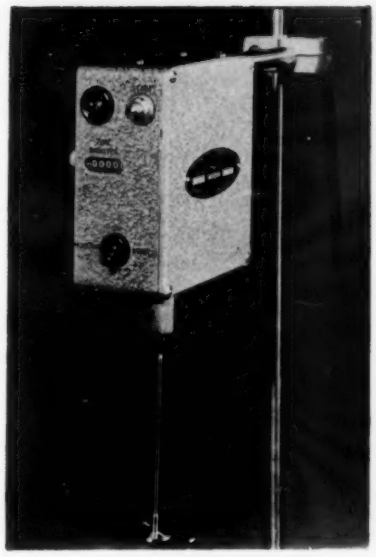
GELATION TIMER
Eliminates Uncertainties

The Tecam Gelation Timer is used for determining the gelation time ("pot-life") of synthetic adhesives, silica sols, drying oils, plastics, and other liquids that gel.

Gelation time is a characteristic of certain substances that is significant in production control, as well as for the subsequent behavior of the material in the customer's hands.

This instrument is said to eliminate the uncertainties inherent in subjective tests. It relieves laboratory personnel of a tedious, time-consuming task, and can be lift working overnigh and on weekends.

A weighted disc immersed in the resin is subjected to a simple harmonic vertical motion, with a periodic time of one minute, by connection to a geared synchronous electric motor. As the resin sets, a point is reached at which stiffness is sufficient to support the weight of the disc during a thirty-second half-cycle. Up to this point, the connecting link has been under tension during both up and down strokes. As soon as the disc is supported, the link on its down stroke is subject to compression causing an electric contact in the link to close a circuit. This in turn opens a relay irreversibly, stops the synchronous motor, and lights a small neon lamp to attract attention.



LAPINE

Arthur S. LaPine and Company, Dept. PVP, 6001 South Knox Avenue, Chicago 29, Ill.

GLOSSMETER
Multipurpose

A new photoelectric glossmeter has been designed. Accuracy is said to be assured by precise machine construction and assembly of all optical components. Adaptability of the instrument to both standard and new gloss tests is achieved by building elements of the incident and reflected light beams onto aluminum blocks which are mountable at either 75°, 60°, 45°, or 20°. Because of the ease with which beam and field angles can be changed, the instrument is claimed to be ideally suited for special gloss tests of new products.

The optical and electrical units are in separate housings connected by cable. The instrument can thus be used:

HUNTER

1. With specimen on front as shown,
2. Turned on its back with specimen mounted horizontally on top, or
3. With optical unit separate and mounted either flush in a table top for examination of large sheets or over a moving web for gloss recording.

For the paint, plastics, and floor covering industries, the new instrument will measure gloss by the long-established 60° method of ASTM D523, and also by the new two-parameter 60° method for furniture finishes (ASTM D1461). Accurate high-gloss measurements by the 20° method of ASTM D523 are possible, but low-gloss measurements of 85° sheen cannot be made.

For high precision, a digital dial is used in the measurement arm of a null-balance bridge. This digital dial is operated either manually or by servo-motor.

Hunter Associates Laboratory, Inc., Dept. PVP, 5421 Brier Ridge Rd., McLean, Va.

GLOVES

For Skin Protection

Perfect hand protection against hi-power solvents is now said to be possible with new coated fabric gloves

Specially designed and treated for safe, effective handling of ketones, acetones and paint-stripping compounds and other hard to handle solvents, these gloves are light weight with curved fingers, wing thumb construction and blunt finger ends for complete hand comfort. And their built-in ruggedness and durability adds longer on-the-job life to every pair. Surety Rubber Co., Dept. PVP, 128 Hall Ave., Carollton, Ohio.

SURETY

GREASE

Resists Fuels & Solvents

New type grease is highly resistant to most fuels and solvents. Solvent resistant grease is said to be impervious to the washing action of a wide range of petroleum, coal tar and chlorinated liquids.

According to the manufacturer, the new grease permits normal lubrication of pumps, bearings and sliding surfaces that must work in the presence of solvents and liquid fuels.

Pennsylvania Refining Co., Dept. PVP, 2686 Lisbon Rd., Cleveland 4, Ohio.

HAND CLEANER

For Dermatitis Problems

New hand cleaner is said to easily remove oil, paint, caulking compounds, and ink.

Liquid hand cleaner obviates the use of solvents for cleaning the skin. Protective ointments are not necessary with this cleaner.

Can be washed away with cold water.

Lixoil Laboratories, Dept. PVP, 176 Federal St., Boston 10, Mass.

HAND LOTION

For Skin Protection

A new protective product is now available for the industrial worker with hands exposed to chemicals, oils, grease, solvents, plastics, and paint.

Applied like any hand lotion, it is soluble in soap and water and protects the hands up to 12 hours. After many tests, it is now being used widely by plastic and chemical industries on the West Coast.

Vanfaire Co., Dept. PVP, 10732 Riverside Drive, North Hollywood, Calif.

HAND PROTECTION

In Aerosol Package

The development of a new type of hand protection in an aerosol package has been made available.

Called Protex-A-Hand, the new hand protection is designed for workmen to keep hands clean and germ-free and to prevent dirt, grease and other grime from clogging in the pores, in addition to cutting the daily washing time.

Made with lanolin and glycerine, it comes from the aerosol can in foam cream form and is rubbed right into the area to be protected.

Acrolite Products, Inc., Dept. PVP, 106 Ashland Ave., West Orange, N. J.

HAND TRUCK

For Horizontal Movement

Two redesigned battery-powered "Powrworker" hand trucks for horizontal movement of loads weighing up to 6000 lbs. now available.

The units are the "Powrworker" low lift pallet truck, for use with pallets, and the "Powrworker" low lift platform truck, for use with skids.

Significant improvements in the low lift pallet truck come from changes in the front frame, cylinders and drive unit. Rather than the sheet metal cover previously used, the protective covering for the hydraulic system is now an integral part of the frame. Piston-type cylinders replace the old ram-type to avoid hydraulic oil seepage. Fork return springs have been placed within the cylinders to prevent damage due to corrosive conditions. The drive unit has been redesigned to provide as high as 33 to 1 gear reduction. Other changes include lift linkages which give longer life, and stronger forks.

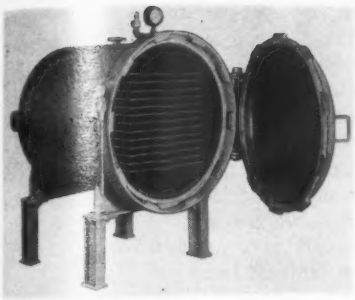
Similar improvements have been made in the front frame, cylinders and drive unit of the "Powrworker" low lift platform truck, and in addition the lift linkage and trail frame have been completely redesigned. This machine now has five inches of lift rather than the normal four inches, and the unit is offered with platform downheights of 6, 9, and 10¾ inches to accommodate various skid sizes.

Industrial Truck Division, Clark Equipment Co., Dept. PVP, Battle Creek, Mich.

HORIZONTAL LEAF FILTER

Uses Filter Cloths or Filter Papers

New filter utilizes permanent media in the form of filter cloths or inexpensive filter papers. In ad-



BOWSER

dition to the conventional, horizontally-mounted filter leaves, the filter features an added bottom leaf contoured to the case so all liquid in the tank can be filtered out at the end of a cycle.

Time saving claimed by the manufacturer, due to the accessibility of filter leaves, permits one-man cleaning in 4 to 15 minutes depending on size. Filter cake may be hosed out without removing filter elements.

Bowser, Inc., Process Filters Div., Dept. PVP, Fort Wayne, Ind.

HYGROMETER

To Indicate Humidities

A new, portable Electro-Hygrometer that can indicate relative humidty electronically from as far as 100 feet away is now available. No tubes are used and readings are almost instantaneous. Furthermore, it is claimed to give faster, more accurate results. No conversion charts or thermometers are needed.

The small, lightweight hygrometer is capable of indicating humidities from 30% to 95%, within a temperature range of 32°F. to 180°F., by simply turning a knob. It operates with an accuracy of ±5%.

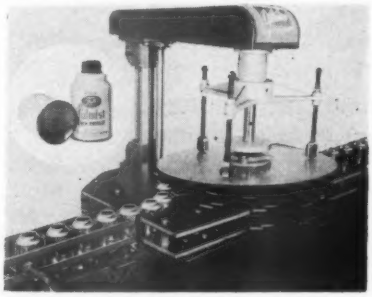
The Electro-Hygrometer is said to be particularly useful detecting dangerous humidity levels where perishables are stored. In addition, due to its remote measuring feature, it can be used to determine humidity inside of difficult locations such as stacks of paper, grain bins, etc. The unit also has considerable application in monitoring humidity conditions in the plant and laboratory where hydroscopic materials are used. Another important use is for checking humidity as a control on the rate of corrosion.

A wide variety of probes are available. They can be furnished in regular shapes or in long, flat shapes to handle special interior applications.

It has a sensitive AC electronic circuit with a meter housed in a sturdy, Bakelite case. The panel control has a three position switch: check, off, and read. When set on a check position, the meter reading is adjusted to 100 per cent to compensate for any variations.

A temperature correction factor for registering above or below 82°F. is listed on the instrument. Otherwise, the results in per cent of relative humidity are read directly from the meter.

Labline Inc., Dept. PVP, 3070-82 W. Grand Ave., Chicago 22, Ill.



GOTTSCHO

IMPRINTING ATTACHMENT

For Aerosol Cans

An automatic packaging line imprinting attachment, designed specifically for coding the bottom of aerosol cans, has been introduced.

Called the TB Aerosol Coder, the imprinter is said to operate at speeds up to 600 cans per minute and to accomodate cans of different sizes without use of change parts. Adjustments for both speed and can size can be made in a matter of minutes, according to the company.

The TB Aerosol Coder does not require cutting into an existing packaging line, and does not need any dead plates. Incorporating a simplified 2-roll fast-dry fluid inking system, the unit affords sharp, permanent imprints of one or more lines even on bottom surfaces recessed as much as 5/8". It is said to hold enough ink for round-the-clock operation. Installation can be made by the user in a few hours.

Adolph Gottscho, Inc., Dept. PVP, Hillside 5, N. J.

PAUL O. ABBÉ

JAR

Alumina-Reinforced Body

A new type of jar with an alumina-reinforced ceramic body is said to have exceptionally high strength and a dense body. In impact and abrasion laboratory tests these new jars have outlasted regular porcelain jars 3 to 1.

Flat gaskets are employed which seat on flat ground surfaces in both jar and cover.

Metal handles, cemented on the covers, have built-in finger holds which make it easy to lift the loaded jar, to remove the cover, or break the cover seal. These handles also distribute across the entire cover the pressure of the crossbar set screw, thus affording added protection against cover breakage.

Form fitting steel neckbands evenly distribute tightening pressure and so reduce the hazard of cracking the neck when the cover is tightened.

A separate crossbar facilitates cleaning the cover. Adjustment has been made easier; a large handwheel, in place of the thumb nut, enables the operator to apply enough pressure to seal the cover. There is no need to use a wrench.

These jars are available in sizes from 5 quarts up to 57 gallons.

Paul O. Abbé, Inc., Dept. PVP, 405 Center Ave., Little Falls, N. J.

JAR BATH

Ambient to 70°C or 100°C Range

Maximum utilization of working area (99.9%) plus patented and proven design features of new jar

BLUE-M

baths incorporating full visibility, complement their extreme versatility of operation, the manufacturer says.

The unique method of agitation of these baths is said to maintain constant uniformity by gentle and automatic pulsation of the agitator plate. Constancy of uniformity is ±0.10°C. Redesigned quality dual control allows automatic selection and repetition of two most used temperatures or serves as an excess temperature cut-off.

The packaged control compartment located at top of bath is easily removed as a complete unit to permit cleaning. Temperature ranges of the jar baths: Ambient to 70°C. or 100°C. These jar baths are recommended for use in A.S.T.M. kinematic viscosity tests, medical and clinical use, and for general laboratory use.

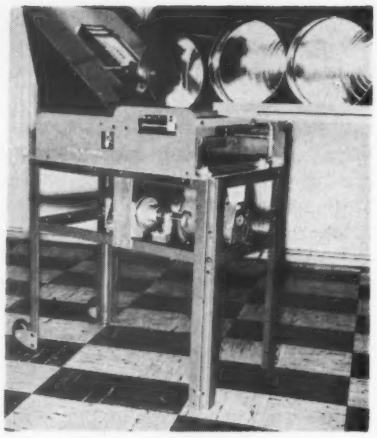
Bluem Electric Co., Dept. PVP, 138th & Chatham Sts., Blue Island, Ill.

LABELING MACHINE
For Round Containers

A new machine for intermittent labeling of round containers has been developed.

The new features of the new Labelette include a ductor roller that applies a thin, smooth coating of glue; special stabilizing legs that tilt-up onto rolling casters; carefully hardened shaft inserts designed to prevent excessive wear; an open, easier-to-fill-and-clean glue tank; and a newly patented glue film lock.

The new machine handles 1½ oz. containers up to 1 gallon size. It's designed for intermittent labeling as spot, face, or wrap around applications. Overall dimensions are



LABELETTE

said to make possible installation in floor space of only 30 inches x 15 inches.

Labelette Company, Dept. PVP, 216 South Jefferson, Chicago 6, Ill.

LABELING MACHINE
Intermittent Labeling

A new line of labeling machines has been announced. The three models are the Roll-Thru Labeler for round containers, Gallon Can Labeler, and Flat Carton Labeler.

The Roll-Thru Labeler (Model 21A) is designed to handle round containers and features an automatic electronic feeder. It labels 30 to 60 units per minute and has a variable speed drive. This new model labels up to 7 inch widths and a 5 inch capacity of labels can be stacked in the feed hopper. Model 21A takes the following sizes: 1½ in. diameter to 1 gallon jug with ears in round glass containers; 1/8 pint through 1 quart in tin round containers; and sizes up to 8 inch diameter in fiber round containers.

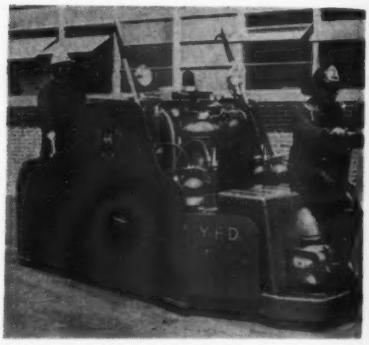
The Gallon Can Labeler (Model 14A) is an adaptation of the Standard Labelette (Model 11A). This new model has the added convenience of an automatic electronic feeder, making it possible to efficiently deliver the label to a gallon can with lugs and to register the label cut-out. Another added feature is its 2-speed option: low or moderate.

The third new model developed is a Flat Carton Labeler (Model 30), and also features an automatic electronic feeder. This model handles labels approximately 1 in. wide by 2 in. long, applying them to any flat carton in knockdown form. It can be adapted for use on any flat carton up to 36 in. wide and also for labeling set-up cartons and envelopes. This machine applies the label to the underside surface. Other features include: speeds from 25 to 50 units per minute, variable speed drive; and a 5 in. capacity of labels can be stacked in the feed hopper.

Labelette Co., Dept. PVP, 216 South Jefferson, Chicago 6, Ill.

LIFT TRUCK
Doubles as Fire Fighter

Dual use of a low lift platform truck, as a production tool and a piece of mobile fire fighting equipment, has been effected.



YALE & TOWNE

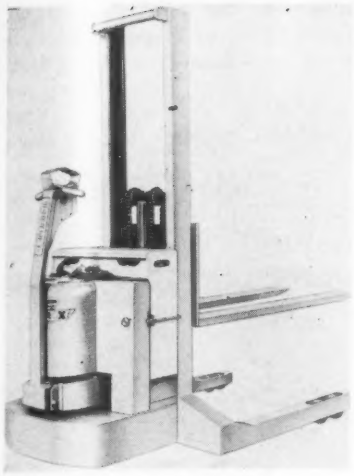
Key to the system is a fire fighting unit mounted on a skid. Unit carries carbon dioxide and dry chemical fire fighting systems, as well as a small tank of water and auxiliary hose for connection to local outlets.

In case of emergency, the low lift platform truck picks up the skid and carries it rapidly to the location where it is needed. The truck designated for handling the fire fighting unit is a standard 66 inch platform Worksaver with a 24-volt electrical system permitting speeds up to 10 miles per hour. The truck has the additional advantage of maneuvering in narrow aisles, low headroom areas and other places where standard fire fighting equipment could not operate.

The Yale & Towne Manufacturing Co., Dept. PVP, 11,000 Roosevelt Blvd., Phila. 15, Pa.

LIFT TRUCK
Narrow Aisle Stacking

A redesigned electric straddle hi-lift truck with 4000 pounds



BARRETT-CRAVENS

standard capacity is now available.

This Powerox Model STG-40 walkie type straddle truck is said to be ideal for handling pallet loads in narrow aisles, in plants where distances and speeds do not justify rider trucks.

Among the features of the STG-40 is the new gear drive designed as a single package unit. The lower transmission assembly and drive wheel are mounted to rotate on 2 heavy-duty thrust bearings, so that only the drive wheel and transmission pivot with the steering handle, while the drive motor remains stationary. The high current power leads securely fastened to the motor never become loose or worn by movement.

Controls are placed for convenience in the steering handle which is shaped to fit the contour of the operator's hand. A thumb touch speed control switch gives instant response through two speeds forward and two speeds reverse, with first speed adjustable to suit the application. Three speeds are available.

A hydraulic lift system combines lift motor, pump, overload by-pass valve and reservoir in a single package unit. An oil filter and electrically operated lowering valve are included.

Barrett-Cravens Co., Dept. PVP, 628 Dundee Rd., Northbrook, Ill.

LIFT TRUCK

24-Volt Power

A warehouser, narrow aisle, electric powered lift truck, incorporating a 24-volt electrical system, has been made available.

The new trucks are built in 2000, 3000 and 4000 pound capacity straddle-stacker models, all of which work comfortably in aisles less than six feet with normal loads.

Lifting channels are welded solidly to the main frame of the Warehouser. The outrigger legs are joined to the base of the frame through a long weld which provides support back through the bulk of the frame section.

Access doors exposing components for service are hinged in positions of protection from bumping in normal truck operation. Points on the truck which are subject to contact with outside objects are all soild steel plate, impervious to operational damage.

By providing the direction indicator, the truck is never apt to be maneuvered into a tight situation where excessive power draw is necessary to move against the action of the steer wheel in order to resume normal operation. The direction indicator also permits the operator to put the truck in motion immediately upon boarding without having to first determine which way the steer wheel is pointed.

Another standard feature on the new Warehouser is the placement of an operating hour meter in the dashboard of the truck. By affording a quick means of determining the exact amount of operation of the truck in a given time, the meter can serve as a guide to the most effective truck utilization for the user.

Yale & Towne Manufacturing Co., Dept. PVP, 11,000 Roosevelt Blvd., Philadelphia 15, Pa.

LIFT TRUCK

4000 & 6000 lb. Capacities

A newly redesigned Powerox Model PG electric platform lo-lift truck has been included in the firm's line of powered lift trucks.

With capacities of 4000 and 6000 pounds, the special feature of the PG is its exceptionally high underclearance obtained by the truck's single frame construction and six-inch full hydraulic lift. By using a specially designed rear axle, only a single frame is used, which eliminates the undercarriage or second frame built into similar type trucks. This makes the PG ideal for moving over steep ramps, with no hanging of the truck at the ramp peak.

Further, overall length of the PG remains constant whether in raised or lowered position. When the platform is lifted, the special rear axle pivots directly underneath and the single frame rises vertically with no forward motion. When released, the frame lowers vertically with no overall growth in truck length.

The new gear drive is constructed as a single piece unit, with motor, transmission and drive wheel mounted in a vertical column.

The hydraulic lift mechanism combines motor, pump, overload relief valve and reservoir in a single package unit. An oil filter and electrically operated lowering valve is included. The ram is vertically mounted requiring less force and pressure for lifting. There is no unusual wear on parts.

Pushbutton controls located at operator's fingertips give two speeds forward and reverse, instant lifting and lowering.

Barrett-Cravens Co., Dept. PVP, 628 Dundee Road, Northbrook, Ill.

LIGHT ABSORBER

Ultraviolet Protection

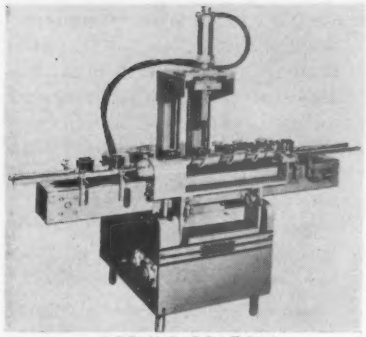
Transforming transparent plastic films and surface coatings into ultraviolet opaque screens is a solution to the problem of ultraviolet degradation of organic materials. The newest commercial product that is said to provide this screening type of ultraviolet protection is Cyasorb UV 24 light absorber (2.2′ - dihydroxy - 4 - methoxybenzophenone).

Its effectiveness is greatest in the lower end of the sunlight spectrum (300-380 millimicrons). Cyasorb UV 24, however, does absorb partially in usable concentrations in the 380-400 millimicron range.

Its absorptive characteristics are especially important in such plastic applications as thin, transparent films and surface coatings. Films and coatings containing Cyasorb UV 24 are opaque to ultraviolet light.

In plastic applications where it is impractical to use an ultraviolet opaque screen, Cyasorb UV 24 can be incorporated into the bulk of the plastic.

American Cyanamid Co., Dept. PVP, 30 Rockefeller Plaza, New York 20, N. Y.



ARTHUR COLTON

LINE MACHINE
Codes Container Bottoms

A new Type 22 production line bottom coder that makes a non-transferable embossed code on the bottom of a metal container has been announced.

The coding process is claimed to be ideally adapted to the coding of paint cans or any other similar type of open-mouth metal container.

The machine enables a manufacturer to code the bottom of a container instead of a lid. The container is coded in the line just ahead of the filling operation. All costs and problems of pre-coding lids and attempting to make the coded lids match the number of containers filled are completely avoided by this coding process.

The machine will code-emboss all sizes of open-mouth cans ranging from ½-pint to one-gallon capacitv. Coding speeds are from 15 to 35 containers per minute. The code is embossed automatically on the bottom of a container each time the timing screw on the machine feeds a can into coding position and holds it while the embossing operation is performed. Embossing of the code in a container is accomplished by a fixed female die in the base of the machine and a moving upper male die that is fed downward by an air cylinder.

Arthur Colton Co., Dept. PVP, 3400 E. Lafayette, Detroit 7, Mich.

LIQUID LEVEL DETECTOR
Uses Nuclear Radiation

Said to meet the need for extreme simplicity and ruggedness, the Model GM-7 Gamma-switch is used with a source of radioactive material to provide high and/or low level alarm actuation without contacting the material in the tank or vessel.

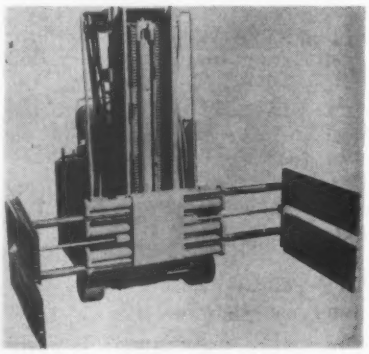
Standard Gamma-switch consists of an "infinite life" Geiger-Mueller tube which detects gamma radiation and through a transisterized integrating circuit applies voltage to a thyratron relay grid. The thyratron actuates an "on-off" adjustable limit latching relay to operate alarms of various kinds.

Switch components are sealed in a 4½" diameter schedule 40 carbon steel explosion proof enclosure. Length is 21"; weight is 30 lbs. Power required is 115 V.A.C., 60 cycles, 0.5 amp.

Where both high and low signals are required two Gamma-switches may be used with a single source where vessel diameter does not exceed the desired range of level measurement. For greater ranges two sources and two Model GM-7 Gamma-switches are generally used. For control use, a single Model GM-7 may be adjusted to provide "on-off" signals in a range from 1/8" to 3".

Radium, cesium-137 or cobalt-60 are the sources of radiation energy and are sealed in a lead shielder holder equipped with a locking shutter. Safety from radiation is provided during shipping, installation and maintenance, as well as in use.

The Ohmart Corp., Dept. PVP, 2246 Bogen, Cincinatti, Ohio.



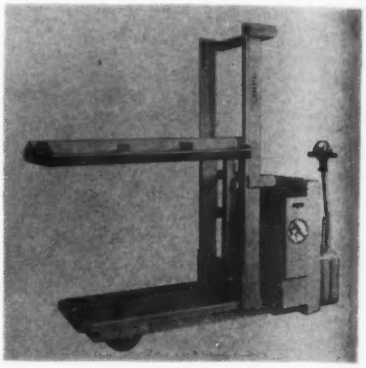
LEWIS-SHEPARD

LOAD GRAB
Multi-Purpose Arms

SpaceMaster Model "J" with cascade clamp and multi-purpose arms makes it possible to handle almost any type of non-palletized load. Multi-purpose arms eliminate the necessity of using a different truck or changing arms when handling different types of loads. These all-purpose arms will handle unit loads of drums, cartons, crates, bales, rolls and many others.

The arm gripping surface is either smooth or rough-top rubber bonded to steel sheets which are screwed to the plates. Other types of surfacing are also available.

Lewis-Shepard Products, Inc., Dept. R9-10-PVP, 125 Walnut St., Watertown 72, Mass.



LEWIS-SHEPARD

LOAD STABILIZER ATTACHMENT
For Handling Unstable Loads

Load stabilizer attachment adapted for use with its low-lift "walkie" line has been developed.

Designed primarily for handling skid loads of coated flat paper stock, which have a tendency to ride off skids and pallets, the stabilizer is also recommended for all types of loads that are not stable.

The stabilizer is hydraulically operated from the operating handle and clamps down on top of the load. Various clamping heights may be furnished to suit the height of the load by the adjustable top clamp arm.

Sponged lined pads clamp safely down on any material and hold firmly in place while the load is transported. This feature is extremely practical when travelling over slanted ramps with fragile or slippery loads.

Lewis-Shepard Products, Inc., Dept. R9-4-PVP, 125 Walnut St., Watertown 72, Mass.

MAGNESIUM SILICATE
Fine Particle Spray

Magnesium silicate is a fine controlled particle size pigment having an average particle size of only 2.3 microns.

The combination of its small particle size, "platey" structure and an oil absorption of 65-72 (Gardner-Coleman) make it es-

pecially adaptable as an aid to flatting efficiency and as an additive to control gloss.

Having a Hegman of 5½-6, combined with its good wetting properties and absence of agglomerates, it is a stir-in pigment which readily disperses and rapidly develops a paint of high consistency exhibiting a "buttery" feel.

Recommended for use in the field of industrial finishes it is likewise adaptable to such finishes as satin finish or egg shell enamels, finishes where a low sheen is required or as an additive where a reduction of gloss is needed.

It exhibits the following special properties:

1. Good white color.
2. Excellent suspension properties—aids in the suspension of prime pigments—exhibits good shelf-life.
3. Non-reactive in presence of acids and alkalis.
4. Is a stir-in pigment.—Only sufficient mixing to effect adequate wetting and dispersion is required.
5. Paint films exhibit toughness and good adhesion.
6. Aids in flatting—controls gloss.
7. Shows improved sanding properties—chipping when scratched is considerably decreased.
8. Exhibits and helps in the development of thixotropic consistency.

International Talc Co., Inc., Dept. PVP, 90 West St., New York 6, N. Y.

MARINE OIL
Variety of Uses

A new product, Marine Oil WC, is now available.

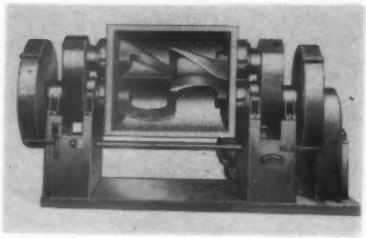
It is recommended by the manufacturer where raw material cost is the prime factor. Product is more economical to use than tall oil fatty acid, the company reports.

The specifications are: Iodine Value—180 Min., 200 Max.; Acid Number—10; Color—Dark; Solids—100%; Dry—Excellent.

T. F. McAdam, Inc., Dept. PVP, 26 Broadway, New York, N. Y.

MASS & PASTE MIXERS
Double Rows of Bearings

A new line of mass and paste



PAUL O. ABBÉ

mixers reported to embody several improvements in design and construction which assure long service under severe operating conditions, freedom from contamination, and a minimum of maintenance and lubrication has been announced.

These new mixers have double rows of lifetime lubricated bearings, located to give the shafts maximum effective support for complete rigidity. These bearings are of the extremely low-friction type and can be used at elevated temperatures, if necessary.

Improved seals assure freedom from contamination. Precision-bored housings for the bearings and seals provide accurate alignment which is built-in for the life of the mixer. The seals are easily accessible for maintenance.

Gears are protected from dust and dirt by guards which remain in place whether the bowl is in the mixing or the dumping position. The gears may be lubricated through doors in the guards.

The particular model shown has a mixing capacity of 150 gallons and is equipped with a double end drive. The bowl is tilted for discharge by means of a hydraulically operated dump.

Such features as jacketed mixer bowls, vacuum or pressure covers, and several different types of blades can be furnished.

Other sizes from 3 to 300 gallons are made in various materials of construction.

Paul O. Abbé, Inc., Dept. PVP, 239 Center Ave., Little Falls, N. J.

MELAMINE-ACRYLIC RESIN
For Industrial Finishes

New melamine-acrylic resin for industrial and automotive finishes, "Melaqua 600," is being produced and marketed to paint manufacturers.

Only pigment and water need be added to the resin to produce a ready-to-spray enamel that excludes the use of solvents and dryers, thus eliminating fire hazards.

With "Melaqua 600," baked enamel films show exceptionally good flow and levelling, high gloss, and clearer and brighter colors than solvent enamels with the same pigmentation. The enamels have excellent color retention.

Outdoor durability is on a par with that of the highest quality melamine-alkyd finishes. Recommended baking schedule is 30 minutes at 300°F.

Suggested uses for this new resin are full color, pastel, metallescent automotive and industrial finishes.

American Cyanamid Co., Plastics and Resins Div., Dept. PVP, 30 Rockefeller Plaza, New York 20, N. Y.

METERING PUMP
Clear & Corrosive Liquids

Model CM chemical metering controlled volume pump, for metering clear and corrosive liquids to chemical processes, has been developed.

Model CM is said to deliver maximum capacities to 28 gph in simplex designs and double that gallonage in duplex designs (two liquid ends with a common motor and base). This pump is constructed to handle pressures to 1,100 psi.

Screwed gland packing provides application flexibility and a choice of materials of construction.

The Model CM features simplified construction for ease of operation and maintenance. Plungers are interchangeable within the pump frame, and models are easily converted in the field from simplex to duplex capacity. Cartridge-type column valves with double ball checks identical on both suction and discharge ports are replaceable at low-cost.

Stroke length, which is 1¼ inches at maximum, is adjustable from 0 to 100 percent of maximum, thereby changing the capacity for the full range of the pump. Capacity is regulated by standard manual T-slot adjustment of the plunger stroke while the pump is stopped.

The Model CM utilizes a standdard drive of ½-horsepower, constant speed electric motor through a right-angle gear reducer. The

motor is an open, drip-proof, single-phase, 115 volt, 60 cycle unit.

The Milton Roy Co., Dept. PVP, 1300 E. Mermaid Lane, Philadelphia 18, Pa.

MILDEWCIDE FUNGICIDE

Light in Color

A mildewcide fungicide which has been specially formulated for paint manufacture is now being produced. Trade-named Puratol-30, the phenyl mercury compound is said to be extraordinarily light in color. It is stable and compatible as an additive with a broad range of oil, alkyd, latex, and water-based paints.

Another significant feature is the color of Puratol-30. Most commercial phentl mercury oleates, for example, have a Gardner color rating of about 5. The Puratol-30 product has a color rating of well below 1.

Physical and chemical specifications of Puratol-30 are: Phenyl mercury (calculated as oleate), 30%; minimum equivalent mercury, 10.77%; specific gravity, 0.94; pounds per gallon, 7.8-7.9; flash point (Tag closed cup), 145°F.; maximum water content, 0.25%; completely soluble in petroleum solvents.

On an average, 0.5% of Puratol-30, based on total weight of the paint, is adequate to impart effective mildew and fungus resistance. The Gallowhur formulation will not affect color, viscosity, drying or other paint characteristics.

It is packaged in 5, 10, and 55 gallon containers of 40 lb., 100 lb., and 475 lb. new weights.

Gallowhur Chemical Corp., Dept. PVP, Ossining, N. Y.

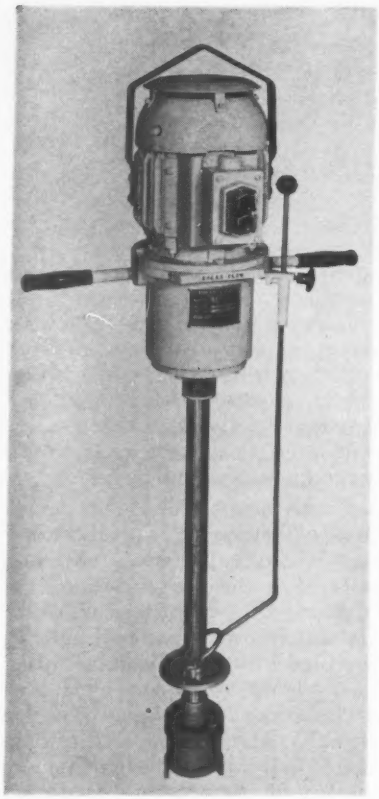
MIXER

Two Rotating Impellers

New Model RL Shear-Flow industrial mixer has been announced.

Incorporating many new features, the new Shear-Flow has proved, performance-wise, it is claimed, to be the fastest, most effective and economical means of achieving complete and thorough dispersing, blending and homogenizing.

Shear-Flow's new RL Hi-Shear Head consists of two rotating impellers and two stationary stators enclosed within a cylindrical housing. The fine clearance between impellers and stators results in a more complete reduction of agglomerates within the mixture.



GABB

The versatile feature of the new Hi-Shear Head is that it can be powered with motors ranging from two to ten horsepower depending on the power requirement demanded by the application. Larger heads and horsepower ratings will also be available. Motor and mixing head changes can be made in a few minutes on the spot, cutting non-productive down-time to a minimum.

Gabb Special Products, Inc., Dept. PVP, Windsor Locks, Conn.

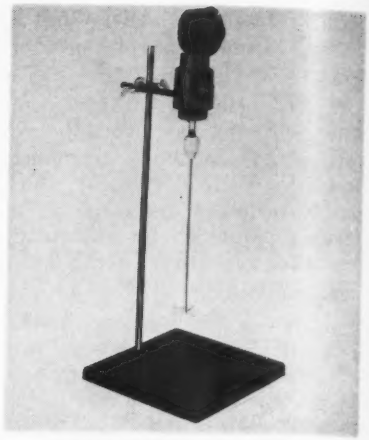
MIXER

Variable Speed

A variable speed lab mixer has been made available.

Equipped with a 1/20 HP motor, it can be set for speeds from 0 to 5,000 RPM. Unit mixes up to 5 gal. of liquid dependent upon viscosity.

Shipped completely set up ready to plug into a 110 V., single phase AC 60 cycle current, it is adjustable up and down and at any angle.



CONSOLIDATED SIPHON

Terriss Div., Consolidated Siphon Supply Co., Inc., Dept. PVP, 22 Wooster St., New York 13, N. Y.

MIXERS

Variable Speed Drive

The introduction of the firm's high speed mixing machinery line has been annonnced.

The trademarked "Kadyzolver" line includes the KDZ 100 series with 10, 15 or 20 H. P. motors with variable speed drive, the KDZ 200 with 25 through 75 H. P. drive, and the KDZ 300 series which includes all special designs for top, side, or bottom entry mixing problems. The standard KDZ 100 and 200 sizes have completely self-contained air-oil hydraulic lift units. A feature of the Kadyzolver blade is the non-clogging, turbine bucket design.

Another feature of the KDZ 200 series is an optional water-cooled blade for heat transfer. The KDZ 200 series can also be fitted with variable speed drive to give an overlapping range of rim speeds by the use of interchangeable blades ranging from 12 inch (by 4 inch increments) to 28 inch diameters. Some special blades of 32 inch diameters have been produced. All Kadyzolver blades can be furnished with ceramic tipped buckets.

Shown in illustration is a KDZ 200, 50 H. P., variable speed unit with tachometer and 20 inch non-water cooled blade. All operator control is conveniently located at the machine. This machine is also built for through-the-floor construction where a circular battery of tanks is also built into the floor for

KINETIC DISPERSION

ease of loading or where low headroom is a factor.

Kinetic Dispersion Corp., Dept. PVP, 95 Botsford Place, Buffalo 16, N. Y.

MIXER/KNEADER
Wide Range of Materials

A planetary mixing and kneading machine is now offered.

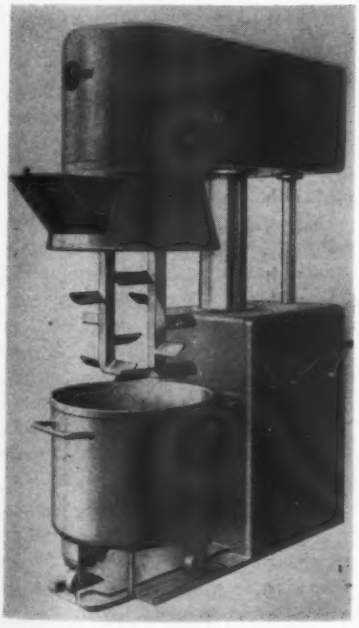
The new mixer processes a wide range of materials highly fluid, viscous or pasty in consistency. An unusually efficient planetary action is claimed by the manufacturer. Two mixing spindles equipped with helically arranged vanes move along the tank wall while rotating at high speed around their own axes. The mixing mechanism is raised and lowered automatically.

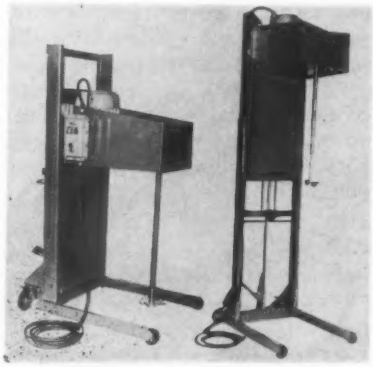
The machine has a new kind of tank speed arresting mechanism. Swivel, tilting, runout, or stationary tanks are provided in capacities from 1 to 350 gallons. The use of several tanks permits almost continuous production.

This mixer is available in several types and power specifications. The shapes and materials of the mixing tools and tanks can be varied according to requirements; stainless steel, bronze, light metals, nickel are obtainable, and also plating with tin, copper, nickel, etc. If heating or cooling are required in the mixing process, double wall tanks can be furnished. Explosion-proof motor and switches are also available.

J. M. Lehmann Co., Dept. PVP, 550 New York Ave., Lyndhurst, N. J.

J. M. LEHMANN





SPECIALTY MACHINERY

MIXING EQUIPMENT
Spark Proof Wheels

New portable models of high speed mixing equipment have been announced.

Model PM 756 will accommodate batches of 300 gallons down to 5 gallons. The unit will center in a 48" diameter tank which will need only 5" clearance underneath. For smaller batches such as 55 gallon drums, the legs will straddle the container.

The mixer is equipped with spark proof and solvent proof plastic wheels and casters. A snap action floor lock is provided which instantly converts the mixer into a fixed unit.

Single speed models operate at 1800 rpm. Variable speed models operate from 800 to 3600 rpm. An assortment of blades is supplied with each unit and a quick-change system permits selecting the exact blade for any condition.

Specialty Machinery Corp., Dept. PVP, 50 Roanoke Ave., Newark 5, N. J.

MOISTURE DETECTOR
Simple Operation

Moisture Detector, Model BD-4, designed specifically for the painter, is now available.

The meter is ready to operate as soon as the switch is turned on and electrode applied to wood or mansonry material under test. Warning light flashes when surface is too wet to paint.

The Moisture Detector is also used for analyzing the cause of paint failure and to prove that moisture is the cause and not the quality of the paint or the workmanship in application.

Delmhorst Instrument Co., Dept. PVP, 655 Cedar St., Boonton, N. J.

ORGANIC ACID
High Boiling Point

The availability of *iso*-decanoic acid (mixed isomers) in commercial quantities has been announced.

The new acid is a complex mixture of methyl-substituted, ten-carbon, aliphatic, monocarboxylic acids having relatively little alpha substitution. The principal isomers are trimethylheptanoic and dimethyloctanoic acids.

The acid has a high boiling point, and is soluble in organic solvents, but not in water. It will react to form salts, esters, amides, amines, etc. Because of its chemical nature, it has potential applications similar to those of coconut fatty acids (caprylic, capric, and lauric) and tall oil-derived fatty acid (pelargonic). Being a primary product, *iso*-decanoic acid is free from fluctuating supply and price.

Potential applications for the acid or its derivatives include: driers for varnishes and enamels, plasticizers and stabilizers for polyvinyl chloride resins, alkyd resin modifiers for nitrocellulose automotive lacquers and alkyd-amine resin applicance finishes, and boiler feed-water defoamers.

Union Carbide Chemicals Co., Dept. PVP, 30 E. 42nd St., New York 17, N. Y.

ELECTRIC HOTPACK

OVEN

Large/Small Scale Testing

High temperature oven allows large or small scale testing of volatile and explosive paints with virtually all danger to personnel and equipment eliminated.

Built-in safety features include controlled surface temperature heater elements, high velocity blower and specially designed blowout panel mounted on the rear of the cabinet.

Heaters operate at low surface temperatures to minimize the possibility of sample ignition, a major cause of oven explosion.

In the event of sudden pressure rise within the chamber, the rear blowout panel is instantly released into a steel cage on the rear of the cabinet. The door of the oven remains closed to shield personnel and equipment in front of the cabinet from the contents of the chamber. Panel is tightly closed during normal operation to provide a positive chamber seal.

An extra margin of safety is provided by the high velocity blower, which assures channeled air movement essential to safe operation.

Temperature range of the oven is 35°C. to 260° ± 0.5° C. Safety ovens are available in both table top and floor models.

Electric Hotpack Co., Inc., Dept. 653-PVP, Cottman Ave. at Melrose St., Philadelphia 35, Pa.

OVEN

Temperature Control

New design in the Saf-T-Bilt oven line includes; improved shape and sizes for industrial laboratory use, more efficient direction of air flow in the work chamber, accurate temperature control throughout work chamber and new safety controls to enlarge its usefulness in laboratories, it is claimed by the manufacturer. The oven is electric heated. It can, also, be adapted to use steam or hot water at available pressures. Two swinging doors provide an oven aperture 37″ x 37″ for easy fast-loading. A heavy duty observation glass window is inserted in one door. Safety features include: a special explosion relief panel in back, safety latches and safety chain on swinging doors; also contactors, relays, motor starters, main controllers and Hi-Limit instruments are enclosed in explosion proof housings, explosion proof motors and strip heaters with welded connections to reduce spark hazards. A forced exhaust system discharges volatiles from work chamber. The oven requires little preheat time to reach temperature. The special convection heat design permits fast heat penetration of all products in the chamber. Available in sizes to fit any laboratory. Despatch Oven Co., Dept. PVP, 611 S. E. 8th St., Minneapolis, Minn.

PAIL RACK

Balances 5-Gallon Pails

A new "pour-easy" pail rack has been introduced.

"Pour-easy" pail rack is said to perfectly balance 5-gallon pails and effectively eliminates lifting and waste by spilling. The pail rack fits all size 5 gallon pails, with or without bails, is heavily constructed and will not tip or sway. With the rack, any material can be poured from 5-gallon pails into small containers or bottles without spilling.

The frame is constructed of 7/8″—20 gauge black enameled steel tubing and the band is 1″—19 gauge zinc plated steel.

Multi-Meter Corp., Dept. PVP, P. O. Box 6594, 1041 Custer Drive, Toledo 12, Ohio.

MULTI-METER

PALLET TRUCK

Three Rated Capacitites

Multiton pallet truck, built by the Steinbeck works in West Germany, is designed to meet needs of U. S. Industry.

A major feature of the multiton pallet truck contributing to high durability and low maintenance is the hydraulic unit, which is a single machined part containing both the lifting cylinder and the fluid reserve cylinder, with fluid flowing through passages bored in the casting itself. There are no tubes, no interior gaskets or packings. Since both cylinders are contained within the single housing, which also contains the reservoir, there can be no leakage of hydraulic fluid. This fluid supply said to last indefinitely, flowing back to the reservoir through the machined channels when it is not needed in the lifting cylinder.

The Multiton pallet truck is made in three rated capacities: 2200 lbs., 3500 lbs., and 4400 lbs.

Stokvis Edera and Co., Inc., Dept. PVP, 18 Secatoag Avenue, Port Washington, New York.

PEARL PIGMENT

Yellow or Bluish Tone

Nacromer Z, a new synthetic pearl pigment, said to have greater brilliance than the best grades of natural pearl essence, has been made available.

In concentrated paste form, Nacromer Z is available in formulations for use with nitrocellulose, ethycellulose, vinyl lacquer, and most other coating vehicles. It is applied by brush, or dip to wood, metal, plastic, glass, leather, paper, and many other materials. No additional equipment or finishing operations are required for applying a Nacromer Z coating.

In addition to simulating natural pearl effects, it is possible to obtain an almost unlimited range of lustrous effects with Nacromer Z by adding transparent pigments or

dyes. Because it provides greater coverage, Nacromer Z may be used at proportions 30% less than usual for other pearl pigments, thus providing greater economy.

Nacromer Z is available in two categories: "A" with a faintly yellow tone, and "B" with a faintly bluish tone. These color variations are not intense colors but are subtle shadings of the usual "silvery" pearlescent character.

The Mearl Corp., Dept. PVP, 153 A. Waverly Place, New York 14, N. Y.

PHTHALOCYANINE BLUE
Improved Green Shade

A green shade phthalocyanine blue pigment, Cyan Blue GT 55-3295, has been introduced.

Cyan Blue GT 55-3295 demonmonstrates excellent dispersibility and rapid strength development in a wide variety of dispersion processes in inks, paints, plastics and floor coverings. In each case, the new pigment develops good color strength and maintains its bright green shade even in high temperature curing processes.

This new blue colorant also is claimed to have excellent acid and alkali stability, lightfastness and durability. American Cyanamid Company, Pigments Division, Dept. PVP, Bound Brook, N. J.

PHTHALOCYANINE BLUE
New Green Shade

A new green shade, non-crystallizing, non-flocculating type phthalocyanine blue, called Solfast Blue G-NCNF 43100, has recently been developed.

This strong new pigment is said to have exceptionally jet masstone and bright greenish undertone.

From deep shades to delicate pastels, the brightness of 43100 is useful as a primary pigment or mixed with yellows to make cleaner greens. Solfast Blue G 43100 has excellent dispersion properties. It has been developed to obtain the ultimate in resistance to flocculation and crystal growth in aromatic solvents. This is shown by accelerated aging as well as room temperature tests.

Pigment, Color and Chemical Division, Sherwin-Williams Company, Dept. PVP, 260 Madison Avenue, New York 16, New York.

PHTHALOCYANINE GREEN
New Type

Heliogen Viridine Y is said to be the first major expansion of the phthalocyanine spectrum since its introduction more than 20 years ago.

The new product is claimed to be the yellowest green pigment available for producing vivid, light-fast colors free of the dichromatic effect often exhibited by mixtures of yellow and green pigments.

It has high-tinting power and is stable to organic solvents, acids and alkalies. It is available in many forms, including toners, lakes, dispersed powders, water dispersions, pastes and presscakes, so as to serve the needs of many industries.

General Aniline & Film Corp., c/o Fuller, Miele, Inc., Dept. PVP, 247 Park Ave., New York 17, N. Y.

PIGMENT BASE
Soft Surfaces & Transparency

A new printing ink base and pigment base, "Lake Alumina" is now available.

Lake Alumina is a form of hydrated alumina said to have many advantages as a pigment been over the standard alumina hydrates. It is the best base available as far as transparency is concerned and has a soft surface to aid overprinting.

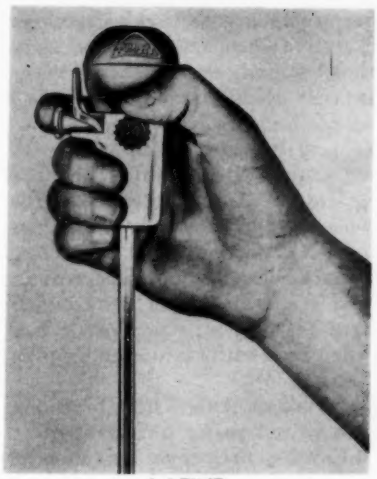
Aceto Chemical Co., Inc., Dept. PVP, 40-40 Lawrence St., Flushing 54, N. Y.

PIPETTING DEVICE
Eliminates Mouth Suction

Pipetting device, the Pumpett Automatic Pipette Control, is said to make it unnecessary to fill a laboratory pipette by mouth suction, which can be dangerous as well as distasteful.

The Pumpett is designed for operation with one hand, either right or left. The thumb presses a large rubber bulb at the top to provide suction, and the forefinger operates the coarse air control valve. For micro quantities, a small internal rubber bulb, depressed by a control knob screw, can be operated independently. The operator keeps liquid under constant oberservation at eye level.

All sizes of pippettes can be accommodated, even microcapillary, in the rubber-lined chuck jaws. Pipettes need not be touched by hand at all. The Pumpett is especially recommended for safety where corrosive, toxic, or infectious liquids and sterile or radioactive solutions are handled.



LAPINE

The Pumpett consists of an acid-resistant molded plastic body surmounted by a surgical-grade rubber bulb. This body houses the stainless steel mechanism which operates the chuck jaws. The Pumpett can be completely dismantled for cleaning and sterilizing if contaminated, and quickly reassembled.

Arthur S. LaPine and Company, Dept. PVP, 6001 South Knox Avenue, Chicago 29, Ill.

PLASTIC FAUCET
New Type Polyethylene

New type of polyethylene has now made it possible to produce a polyethylene plastic drum faucet that will not stress-crack, break or leak.

It is said to have the ability to withstand punishment that no other plastic to this date has been able to match.

Plastic faucet will not react with any chemical products, rust or corrode. It seals hand-tight without need for a wrench and has no-drip threads between the barrel and the body of the faucet.

Multi-Meter Corp., Dept. PVP, 1041 Custer Drive, P. O. Box 6594, Toledo 12, Ohio.

PLASTIC WHEEL
For Storage Rack

New plastic wheel developed especially for live storage racks has

been introduced. Consisting of an exclusive wheel and bushing design, the plastic wheels are not only lower in cost than standard-type steel wheels but also have greated load-bearing capacity when used with all but hard surfaced items.

The full 5/8" flat tread of the wheels is approximately 60 per cent greater than the carton supporting surface of the standard steel wheels. The result is 25 per cent higher load-bearing capacity per wheel when used with cartons and similar items.

In use at several test locations, the wheels have already proved themselves to be equal to or superior to steel wheels, the company reports. In addition to better load-bearing capacity, the plastic wheels are said to be lighter in weight and have excellent resistance to corrosion.

The bushing design provides a foolproof method for locking the plastic wheels in place. When slipped onto the axle, the bushing grips into the axle notch with such force that, once in place, the assembly is permanent.

N-H Standard Corp., Dept. PVP, 517 Communipaw Ave., Jersey City 4, N. J.

PLASTICIZERS

Low Viscosity

D I—(2-ethylhexyl) isophthalate (DOIP) has been added to the list of plasticizers available from Eastman Chemical Products, Inc. A high quality primary plasticizer for both direct compounding and plastisol formulations, DOIP compares favorably in performance characteristics with the well known dioctyl phthalate (DOP).

The plasticizer efficiency of DOIP in poly (vinyl chloride) is excellent. Film comparisons with DOP plasticized material show very close agreement in most physical properties, although DOIP plasticized films have a lower volatility loss on heat aging and are slightly more resistant to water extraction.

In plastisol formulations with poly (vinyl chloride) DOIP gives a lower viscosity than DOP while the physical properties of the two cured films are essentially the same. DOIP plastisols have very good viscosity stability during aging at room temperature.

DOIP is also compatible with cellulose nitrate, ethylcellulose, chlorinated rubber, polystyrene, and cellulose acetate butyrates of high butyryl content. Some typical properties of Eastman's dioctyl isophthalate are as follows:

Color, APHA, p.p.m.	20
Acidity, as isophthalic, %	0.003
Ester content, %	99.4
Ash	0
Boiling point, 760MM, OC	358

Eastman Chemical Products, Inc., Dept. PVP, Kingsport, Tenn.

POLYBUTENE

High Viscosity

A new Indopol polybutene with unusually high viscosity has been announced. This extends the line which now includes 10 products with viscosities ranging from 40 SSU at 210°F. to the new Indopol H-1900 having a viscosity of about 20,000 SSU at 210°F.

Promising applications for Indopol H-1900 include use in adhesives and pressure sensitive tapes, as a thickening agent, and as a capacitor insulation impregnant. It may also be used in lubricants to improve shear stability and as a viscosity index improver.

Indopol H-1900 offers a number of important advantages in addition to its high viscosity and high molecular weight. It is non-drying, light in color and stable to sunlight, moisture resistant and thermally decomposes without residue at temperatures above 650°F. Indopol H-1900 also exhibits excellent electrical properties.

This new Indopol polybutene is commercially available in drum and tank car quantities.

Amoco Chemicals Corp., Dept. PVP, 555 Fifth Ave., New York, N. Y.

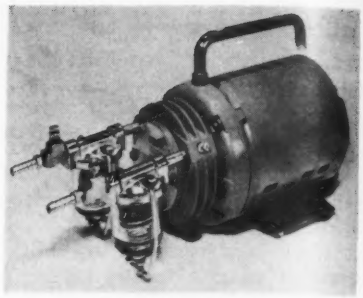
PORTABLE PUMP

Either Vacuum or Pressure

New compact, portable pump which provides either vacuum or pressure, and employs only a rotor and four vanes as moving parts has been announced.

The rotor is mounted integral to the motor shaft and the non-metallic vanes assure quiet operation. Adjustable air vents are provided on both inlet and outlet ports, to produce any degree of pressure or vacuum up to the maximum.

Lubrication is provided by the



CENTRAL SCIENTIFIC

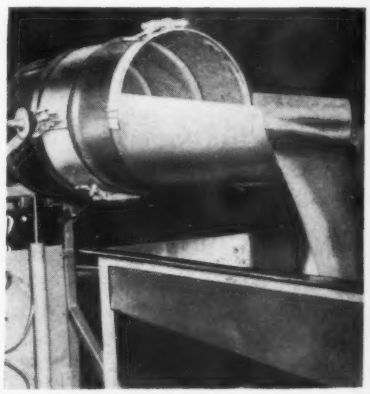
incoming air stream which picks up minute droplets of oil from a saturated wick before passage into the pumping changer.

An exhaust filter is provided to remove oil vapors and also serve as an efficient noise muffler.

The unit will provide vacuum up to 27 inches (mercury), and a maximum pressure of 25 psi may be utilized. Free air capacity is approximately 1.3 cubic feet per minute.

It operates with a ¼ hp motor at 1725 rpm on 115-volt, A. C. current, with thermal overload protection.

Central Scientific Co., Dept. PVP, 1700 Irving Park Rd., Chicago, Ill.



STERLING FLEISCHMAN

POURING SPOUT

Dry or Viscous Materials

An adjunct to the firm's "one man drum lift" has been made available—a pouring spout for use in dumping dry or viscous materials.

Attached to the drum in seconds, it affords pouring control without spillage. It can be furnished for drums of any size.

Available in carbon or stainless steel.

Sterling Fleischman Co., Dept. PVP, P. O. Box 94, Broomall 1, Pa.

PROPORTIONING PUMP
For Metering of Liquids

High pressure, low capacity, variable volume, reciprocating plunger pumps are used for feeding as little as 1.5 gph to as much as 108 gph of corrosive or non-corrosive liquids into chemical processes, water treatment systems and other applications where extreme accuracy and long pump life are requirements.

Standard construction is said to equal the heavy duty models of competitive makes. The pumps are said to normally handle pressures to 625 psi and several thousand psi with special construction, and are available in 304 and 316 stainless, Hastelloy, Carpenter 20 and other steels and ceramic plungers when corrosive liquids are to be metered.

Accuracy is maintained through double suction and double discharge ball checks and seats which have long life since the design eliminates excessive spinning of the balls, seat wear and pockets where harmful deposits may build up. Manual or automatic adjustment of the stroke can be made from 0 to full stroke while the pump is in operation through a special stroke control mechanism.

Walter H. Eagan Co., Inc., Dept. PVP, 2336 Fairmount Avenue, Philadelphia 30, Pa.

PROTECTIVE CREAM
Wide Application

The problem of resins, solvents, lacquers, oils, pigments and acids which irritate and discolor the skin has claimed to have been solved by a newly developed barrier cream called "Kerodex."

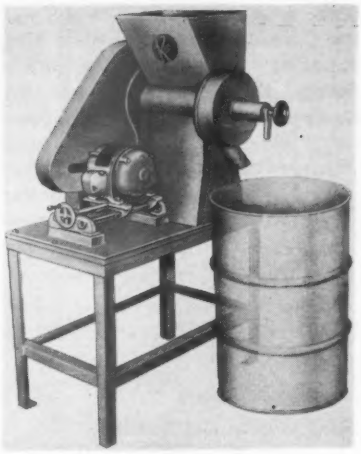
Greaseless, stainless cream offers complete protection against acids, alkalis and other chemical irritants. It is said to dry quickly and last a long time.

Tests have shown that "Kerodex" applied to hands and arms before work will prevent not only skin discoloration, but irritation.

Ayerst Laboratories, Dept. PVP, 22 East 40th Street, New York 16. N. Y.

PULVERIZER
Revolving Crushing Roll

A heavy duty dry crusher or pulverizer has been added to the



CHARLES ROSS

dry ginding equipment manufactured by the company.

This machine, the #70-H size 4 Crusher, incorporates a revolving crushing roll inside the hopper to give material a preliminary breaking down before feeding between special hardened steel grinding plates. Clearance of plates and fineness of grind are simply adjusted by handwheel, and when desired fineness is obtained, setting can be locked and material kept feeding through.

The crushers feature variable speed drive as standard equipment which is said to deliver best results with maximum production. Indicating gauge insures precise control of fineness of grind. The #70-H size 4 Crusher can be readily dismantled and cleaned within two or three minutes.

Charles Ross & Son Co., Dept. PVP, 148 Classon Ave., Brooklyn 5, N. Y.

PUMP
Air-Operated

A new air-operated, reciprocating type stainless steel pump has been developed. This pump, called the "Pogo SS," is designed for the pumping and transferring of materials direct from the original 55-gallon containers, without costly spillage and waste, to the point of application.

Pump is claimed to specifically answer the handling problems of fluids that might be contaminated.

Lightweight, the "Pogo SS" weighs less than 20 pounds and is space-designed with the air motor and pump sections completely separated eliminating the possibility of material entering the air motor or other critical parts.

The pump delivers from three to five gallons of material per minute and delivers on both up and down strokes assuring the utmost in economy of operation and longer maintenance-free life. Air motor piston cups are self-oiling and never require lubrication.

Binks Manufacturing Co., Dept. PVP, 3122 Carroll Avenue, Chicago, Ill.

PUMP
Lab-Metering-Proportioning

Pump, said to be ideal for handling neutral or corrosive liquids and for gases, is now available.

A control knob permits the volume per stroke to be independently controlled from zero to maximum, even when running. The transmission operating in oil is separated from the pistons to eliminate contamination. Pump bodies are readily demountable and made of either ceramic, tempered glass or teflon, with ground-in ceramic plungers.

The clearance volume remains constant since the piston returns to the same point on the output stroke. The pump makes about 95 strokes per minute that can be varied from 0" to 19/32".

With a dual pump it is possible to meter fluid with one section and gases with the other. A dual pump weighs about 31 lbs. net. Single and dual laboratory, as well as multiple heavy industrial models are available.

C. H. Stoeling Co., Dept. PVP, 308 W. Calumet Ave., Kiel, Wis.

PUMP
9 Moving Parts

A new pump claimed to be completely different in principle and design from any now in existence, will pump anything that flows according to the manufacturer.

The Crossley Free-Piston Pump has only 9 moving parts.

The pump impels a continuous air-free flow without pulsating or surging: It requires no safety or relief valves; when a stoppage occurs, the pump stops. It can be operated with complete safety and efficiency submerged, or under any condition. There are no motors or engines, drive shafts, packings, seals, oils or greases.

CROSSLEY

The pump is operated by compressed air which is introduced into each cylinder in sequence; while the left cylinder is discharging, the center cylinder has filled and is waiting, and the right is filling. Chambers fill by gravity. In each chamber is a nylon free floating piston and two nylon ball valves. Operation is automatically controlled by a separate control box. Because one chamber can be stopped while the other two continue to function, the pump can operate indefinitely without being shutdown. The pump can be made in any size desired.

Crossley Machine Co., Dept. PVP, Mammoth & Bell, Trenton, N. J.

PUSH-OFF DEVICE
For Take-It or Leave-It Systems

New push-off device with side shifter and multiple forks has been developed.

This special attachment is a product specifically designed and manufactured for establishments using a take-it or leave-it pallet system. This is the system whereby unit loads are handled in process and placed in storage on pallets but are shipped without pallets. The take-it or leave-it pallet is basically a standard double-faced wood pallet with the addition of 4 or 6 two-inch square stringers equally spaced and nailed across the top boards. Corrugated steel pallets specifically designed for this system are also available. The multi-purpose equipment is capable of handling the palletized unit loads in process and storage and also the non-palletized loads during shipment. During process and in storage the palletized loads are handled in the conventional manner. When loading carriers, the multiple tined forks are slid between the small stringers on the top of the pallet and the load raised off. The load is then moved to the carrier and pushed off the forks.

Lewis-Shepard Products, Inc., Dept. PVP, 125 Walnut St., Watertown 72, Mass.

PVAc EMULSION
Good Mechanical Stability

A new fine particle polyvinyl acetate homopolymer emulsion is now available in commercial quantities.

Designated Gelva TS-85, the emulsion has an average particle size of 0.2-0.3 microns and an emulsion viscosity of 1400-1700 cps. at 55% solids. The emulsion is said to have excellent mechanical stability, good blocking resistance and freeze-thaw stability and is highly stable on dilution. Tolerance to most plasticizers: borax, inorganic salts and most organic solvents (except ethyl alcohol) is excellent, the company states.

It is also reported that films cast from this emulsion have outstanding gloss and clarity and possess very good resistance to water, grease and oils. Films are flexible at room temperature without the addition of plasticizer.

Gelva TS-85 is suggested for use in paper coatings, textile finishes, adhesives and surface coatings.

Shawinigan Resins Corp., Dept. PVP, Springfield 2, Mass.

PVAc RESIN
High Degree of Carboxylation

A new carboxylated polyvinyl acetate copolymer resin in now available in commercial quantities.

Designated Gelva M-7 V-100R, the new resin is said to have a higher degree of carboxylation than standard polyvinyl acetate copolymer resins. In addition, the new resin offers enhanced heat resistance and higher solution and melt viscosities. Although the resin is not soluble in alkali, films from organic solvent solution may be dispersed by the use of strong alkalies.

Gelva M-7 V-100R is suggested primarily for use in formulating paper adhesives.

Shawinigan Resins Corp., Dept. LSJ-PVP, Springfield 2, Mass.

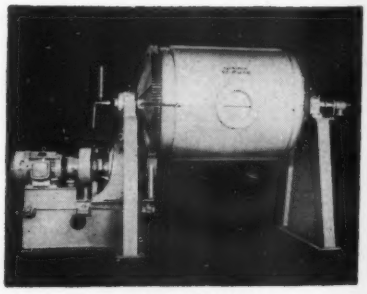
PVP/VA COPOLYMER
Solid Form

A new vinylpyrrolidone/vinyl acetate copolymer in solid form is now commercially available.

It is the newest member of the PVP/VA Copolymer series which Antara has marketed in 50% alcoholic solutions. These copolymers are unique in their film-forming and adhesive properties, broad solubility range, and exceptional compatibility characteristics.

Known as PVP/VA S-630, the new copolymer represents a monomer ratio of 60% vinylpyrrolidone and 40% vinyl acetate. It has a K-value of 30, corresponding to a mean molecular weight of 40,000. It forms stable suspensions in water and may be incorporated into aqueous or organic solvent systems. PVP/VA S-630 is designed for use wherever it is necessary or desirable to avoid alcohol.

General Aniline & Film Corp., General Dyestuff Co., Div. of General Aniline & Film Corp., 435 Hudson St., New York 14, N. Y.



PATTERSON

REACTOR
Mixes Materials Uniformly

The Mil-Reactor, a new tool for performing multiple operations in a single processing unit, is said to combine the functions of a ball mill and a reactor. The unit reportedly makes possible grinding in the presence of carefully controlled temperature and pressure conditions. Access lines permit addition of liquids, slurries or gases while the mill is in operation. Also, vapors may be removed while solids are being dried.

The reactor will mix materials uniformly while they are being

reacted, maintaining desired heat transfer rates and producing material of desired particle size. It is available in sizes from 5 to 500 gallons working capacity. Internal pressures may be controlled between full vacuum and 50 psig. The heat transfer jacket is suitable for pressures to 125 psig and can be used for either heating or cooling. Patterson Foundry and Machine Co., Dept. PVP, 1250 St. George St., East Liverpool, Ohio.

HUNTER

REFLECTOMETER
Measures Whiteness

Instrument designed to measure the whiteness, reflectance, yellowness, and opacity of white and near-white paints and plastics can be equipped with an ultraviolet absorbing filter which may be alternated between the incident and viewing light beams to measure directly the contribution of the widely used fluorescent brighteners to specimen whiteness. Instrument uses paired vacuum tubes in a null Wheatstone bridge circuit. It employs a 45°0° geometry and has green and blue tristimulus filters each with a separate pair of phototubes.

Instrument is built in two sections identical in size and shape so that when bolted together they form a small compact unit. On the left side are the light source, phototubes and 2¼" round specimen viewing area. On the right side are the measuring circuit, vacuum-tube galvanometer and digital dial. When desired, these two sections can be separated by the cable length between them for convenience of sample presentation.

Hunter Associates Laboratory, Inc., Dept. PVP, 5421 Brier Ridge Road, McLean, Va.

REFLUX CONDENSER
Can Be Stacked

A reflux condenser, said to be completely new, is now available.

The new 7-748 condenser consists of a bulb 2½" in diameter by 4½" long with outer standard-taper 24/40 joint at the top and inner 24/40 joint at the bottom. Overall height: 9½".

Since only standard-taper joints are used, the condenser is easily inserted into a system.

Several 7-748 units, it is claimed, can be stacked one atop the other.

A double-wall thimble-shaped condenser is sealed inside the outer bulb with two sidearms (for water connections) extending through the bulb. The open end of the condenser faces downward so that vapors passing into the bulb are condensed, for the most part, on the condenser's inside wall.

Fisher Scientific Co., Dept. PVP, 384 Fisher Building, Pittsburgh 19, Pa.

RESIN
Five-Minute Drying

Development of a rapid air-dry resin for industrial top coats that set tack free in about five minutes and hardens into a tough, glossy finish without baking was announced.

With "Aroplaz 6006," industrial finish formulators can offer enamels with lacquer-speed dry as well as application features and performance characteristics never before possible, the company says.

The five-minute tack free drying time of "Aroplaz 6006" compares with 10 minutes for a very fast styrenated alkyd and 30 minutes for a very fast pure alkyd.

Not only does "Aroplaz 6006" set faster than any comparable vehicle but it also has the flexibility, durability and color retention of conventional alkyd enamels.

The resin was developed for finishes for farm and construction machinery, trucks, trailers, cabinets, metal furniture, toys and other metal industrial and consumer items. Because of its air-drying speed, fast tape time and recoatability, "Aroplaz 6006" is ideally suited for auto painting.

Archer-Daniels-Midland Co., Dept. PVP, 700 Investors Bldg., Minneapolis 2, Minn.

RESIN
For Multicolor Paints

Resin, called 1100 TMV, is said to offer numerous advantages for multicolor paints—as well as for colored aluminum and one-color coatings.

1100 TMV requires only lower-priced petroleum solvents and has a low odor level.

Additionally, multicolor paints made with 1100 TMV are claimed to be non-penetrating, washable, easily applied to any rough or smooth paintable surface. They do not require a special undercoat and are resistant to alkalies.

Other features include outstanding stability in conventional cans and glass containers with no skinning and minimum settling. Because of the resin, thick-coat applications can be made without streaking or lap marks. Further, the vehicle's antistatic properties insure a multicolor paint with the advantage of less-dirt adherence.

Marbon Chemical Division, Borg-Warner, Dept. PVP, Box 68, Washington, W. Va.

RESINOUS SOLUTION
Multi-Application

New resinous solution has been developed.

The product, called Darasol, is claimed to be suitable for a diverse range of aerosol applications and other potential uses in conventional packaging.

In aerosol form, the product is said to be non-flammable, provides a low odor factor, and eliminates valve clogging and the need of special valve treatment.

Exceptionally fast drying and does not sag and run under ordinary application of even heavy coats.

Pigments and coloring materials of aerosol formulations do not settle out into solid masses in the container.

Available in one-gallon, five-gallon, and 55-gallon drums, either in clear or a wide range of colors.

Diamond Alkali Co., Chlorinated Products Division, Dept. PVP, 300 Union Commerce Bldg., Cleveland 14, Ohio.

RESINS
Available to American Firms

Dutch know-how and attention to quality has resulted in the de-

velopment of resin products for the paint technologist throughout the world which are now available to American paint manufacturers.

Among new offerings by this firm is Setal 20, a medium oil-length alkyd resin based on linseed oil. Thanks to the ingenuity of the Synthese chemists, this resin effects rapid drying and hardening. The paint technologist who wants to improve his air-drying enamels will find Setal 20's properties in air-drying indoor and outside enamels more than satisfactory.

Setal 20 is especially suited for numerous special purposes. It is said to have:

(a) Outstanding water resistance, especially good for rust-preventing paints.
(b) Good flow, for dipping enamels.
(c) Good compatability with melamine resins, for stoving enamels.
(d) High gloss and outstanding weather resistance, for air-drying and forced-drying repair enamels for motorcars, trucks, etc.
(e) Good pigment absorption capacity and excellent compatability with basic pigments, as a grinding medium.

Netherlands Trade Commission, Dept. PVP, 551 5th Ave., New York 17, N. Y.

ROLLER MILL
For 1-Pint to 5-Gallon Jars

New type of laboratory roller mills have been recently introduced.

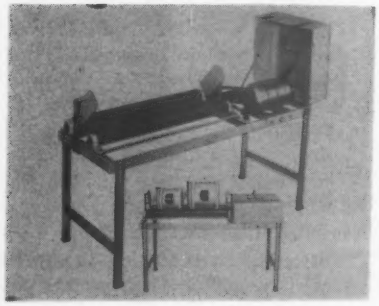
The new laboratory roller mill boasts neoprene-covered steel rolls that resist chemical and abrasive action and can be moved in or out to accommodate one-pint to five-gallon jars. This is done without bolts or nuts. One roll is a power roll, the other an idler roll. The idler roll is picked up by its frame on one side and slid into position for a desired jar size and held there securely by steel pegs which insert into pre-spaced holes in the mill's frame. There are no bolts to loosen. . .no nuts to tighten. The entire operation takes but a few seconds.

Another feature of the new roller mill is the variable pitch drive which allows smoother starts and stops and adjustment for numerous roll speeds. Roller bearings are permanently lubricated and do not need attention.

The mill is driven by a 1/3 HP, 115 volt, single phase, 60 cycle, motor-gear reducer power unit. An eight-ft. long, heavy-duty, rubber-covered cord is provided. Power unit and V-belt drive are covered completely by a specially designed hood which affords protection.

McDanel Refractory Porcelain Co., Dept. PVP, P.O. Box 560, Beaver Falls, Pa.

MCDANEL



ELECTRIC HOTPACK

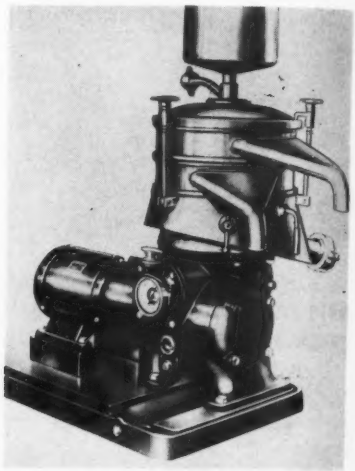
SAFETY OVENS
Blowout Panel

Designed with temperature ranges from 35°C. to 280°C., new safety ovens permit safe testing and conditioning of volatile paints and lacquers with virtually all danger to personnel and equipment eliminated.

Built-in safety features include automatic overtemperature protection, explosion proof latches and unique blowout panel mounted on the rear of the cabinet. In normal operation, the blowout panel provides a positive chamber seal; however in the event of explosion or sudden pressure build up within the chamber, the blowout panel is released into a steel cage located on the back of the cabinet. The door of the oven remains closed to shield personnel and equipment in front of the cabinet from the contents of the chamber.

An extra margin of safety is provided by low surface temperature heaters and forced air circulation, which provides three air changes per minute within the chamber to prevent storage of explosive fumes.

Electric Hotpack Company, Inc., Dept. PVP, Cottman & Melrose, Philadelphia 35, Pa.



CENTRICO

SEPARATORS
Pilot-Scale Versions

Because of the rapidly increasing popularity of new types of continuous centrifugal separators and clarifiers in chemical and food processing such as the Westfalia Automatic De-Sludgers and Nozzle Separators (Concentrators), two new pilot-scale versions of these centrifuges have been introduced.

Similar in construction and operation to the "parent" machines, the Skog "Jet-O-Matic" Nozzle Separator and the Saooh De-Sludger, the pilot-scale models can be used for both laboratory research and pilot plant production, to accurately determine the characteristics of any process involving continuous removal of solids in two ranges: the Skog for liquids with solids content of up to 20 per cent; and the Saooh for liquid mixtures with up to 5 per cent solids content. Centrico, Inc., Dept. PVP, Englewood, N. J.

SHORT OIL ALKYD

Weather Resistant

Development of a short oil, non-drying alkyd resin, claimed so resistant to weathering that automotive finishes made with it will retain their original color and gloss for years, has been announced.

In addition to maximum weather durability, color and gloss retention, enamels and lacquers based on Aroplaz 2580-X-60 possess high hardness and good flexibility. Enamels formulated with the resin is said to have excellent "hot hardness," toughness and resistance to marring and scratching.

Although designed specifically for baking enamels requiring superior weather resistance, Aroplaz 2580-X-60 also improves the weather durability of nitrocellulose lacquer finishes. As a lacquer plasticizer, the resin may be used in high concentration without reducing hardness below acceptable levels. Improved gloss and color retention and greater resistance to cracking and checking from weather exposure are obtained.

For appliance finishes, Aroplaz 2580-X-60 provides excellent hardness and color retention, permitting greater choice in the type and amount of melamine resin used.

Based on a recommended enamel formula with a 30 per cent melamine level, Aroplaz 2580-X-60 shows a Sward hardness of 30 when baked 20 minutes at 200°F. A 30-minute bake at the same temperature raises the Sward hardness to 36 and 40 minutes to 40. At 300°F., a 20-minute bake produces a hardness of 48 and 40 minutes increases the hardness to 50.

Again using a recommended white enamel formula, Aroplaz 2580-X-60 has a flexibility rating of 10 per cent on the GE Impact Tester after a 15-minute bake at 300°F and 2 after baking for 24 hours at the same temperature.

Resin and Plastics Division, Archer-Daniels-Midland Co., Dept. PVP, 700 Investors Building, Minneapolis 2, Minn.

SOLVENTS

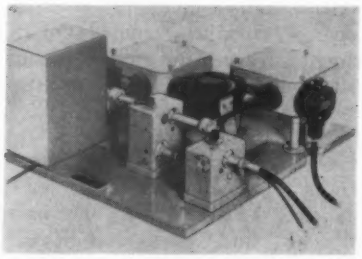
For Chromatographers

Five high-purity solvents certified as to mol percent purity are now available.

This certification is a photocopy of the actual curve taken from the recorder of a Fisher-Gulf Partitioner, and is attached to each reagent. All five solvents have a minimum of 99 mol % purity. They meet American Chemical Society specifications (where these have been established) as well as those of the Fisher "Spectranalyzed" line (spectrophotometrically-pure solvents furnished with individual absorption curves).

The solvents are: A-20 *Acetone*; B-414 *Benzene*; C-570 *Carbon Tetrachloride*; A-936 *Methyl Alcohol*; and D-123 *Methylene Chloride.*

Fisher Scientific Co., Dept. PVP, 384 Fisher Bldg., Pittsburgh 19, Pa.



FERRAND

SPECTROFLUOROMETER

Two New Types

In addition to the firm's standard spectrofluorometer, two new types of spectrofluorometers are now available.

One is a dual-purpose instrument for spectrofluorometric transmission measurements in the spectral region from 220 to 650 mu.

The second is a triple-purpose instrument which can be utilized as a spectrofluorometer, spectrophotometer or for reflectance measurements of solid samples such as textiles, plastics, paints, paper, powders, etc.

Ferrand Optical Co., Inc., Dept. PH-4, PVP, Bronx Blvd. & East 238th Street, New York 70, N. Y.

SPECTROPHOTOMETER

Double Beam

A new double beam, automatic recording infrared spectrophotometer, said to incorporate the most advanced spectroscopic features, has been developed.

Among the features unique to the new Model 221 spectrophotometer are an automatic gain control system and a programmed scanning speed system.

There are two primary modes of operation with the Model 221, automatic and cycle. In the automatic mode, at the end of a preset wavelength interval, the instrument will run back to the starting point with the pen off the paper and stop.

In the cycle position, the instrument will run back to the starting point and then repeat the scan as often as desired. This mode is particularly useful for kinetic studies, or for determining the effect of ultraviolet light in decomposing a sample or causing a reaction to progress.

The spectrophotometer scans a spectral range from 1.0 to 15.5 microns with standard NaCl optics, and a range from 0.5 to 38 microns with other available prisms and interchange assemblies. With standard NaCl optics, accuracy is ±0.015 microns, reproducibility is ±0.005 microns, and resolving power is 0.02 microns at 12 microns.

Stray radiation is less than 2% at 15 microns with automatic filter, and less than 0.1% at 9 microns with automatic filter. Transmittance responsibility is ±0.5%.

The instrument size is 39″ long by 16″ wide by 22″ high, with external power supply and amplifier.

The only services required are electrical—117 volts, 60 cycles current.

Perkin-Elmer Corp., Dept. PVP, Norwalk, Conn.

SPRAY

Eliminates Washups

New pushbutton aerosol product for the paint and varnish industry will increase the daily output of roller mills by eliminating the washup at the end of the days work. A quick spray application on the rollers and hopper just before shut down time will prevent all resins, inks, varnishes or grinding vehicles from skinning or drying overnight or over the weekend. To start up production again simply throw the switch and the mill is off to a flying start with full speed production in seconds.

Manufacturer claims that the spray will not affect the vehicle, pigment or batch it any way and is harmless to roller mill parts. It can also be sprayed on the mill during lunch time shutdowns to

prevent skinning or drying. When sprayed on the inside lining of cans before the filling operation you can be assured on no skinning even after shipping. Unfinished batchs of paint, ink or varnish can also be protected against skinning.

Acrolite, Graphite Arts Div., Dept. PVP, 810 Martin St., Rahway, N. J.

SPRAY DRIED PVA
Reconstituted by Adding H_2O

A spray dried polyvinyl acetate resin has been introduced.

Called Darex ESD (for experimental spray dried), is easily reconstituted by adding water. It is now available at 47 cents a pound in truck load quantities.

The dehydrated emulsion, which can be used in place of liquid vinyl emulsions wherever presence of water is undersirable, is expected to find wide use as an additive in dry mixes specialty portland cements, as a vehicle for industrial paints, as an adhesives base, and in many other applications.

A white powder, Darex ESD cuts freight costs for users, can be stored indefinitely, is unaffected by freezing, and can be mixed as needed where small batches are prepared at a time.

Dewey & Almy Chemical Division, W. R. Grace & Co., Dept. PVP, Cambridge, Mass.

STABILIZER
Barium-Cadmium Complex

Development of Nuostabe V-134, a barium-cadmium complex stabilizer, has been announced.

Laboratory tests, in various types of vinyl formulations, indicate, it is claimed, that Nuostabe V-134 is more effective than any such liquid stabilizer presently available.

The new product is primarily for use in calendering, plastisol, organosol, extrusion, injection molding and solution formulations. The primary advantage of Nuostabe V-134, over standard barium-cadmium complex stabilizers, is that it is said to impart superior heat and light stability and sheet color to these compounds at no additional cost.

Nuodex Products Co., Dept. PVP, Elizabeth, N. J.

STABILIZER & THICKENER
Wide Variety of Applications

The commercial introduction of a new chemical, with unusual properties that suggest its use in a wide variety of applications, has been announced.

This new product, "Natrosol 250," is a water-soluble stabilizer and thickener. Extensive development work suggests its application in water-based emulsion paints, preparation of polyvinyl acetate emulsions, and latex emulsions for adhesives and coatings.

Natrosol is a nonionic water-soluble hydroxyethyl ether of cellulose, available in four viscosity types. One of its unique properties is that one viscosity type is said to be the highest available for this type of chemical, an advantage which suggests Natrosol as the most efficient thickener among nonionic cellulosics.

Other advantages claimed of Natrosol 250 include its ability to produce unusually clear, smooth, sparkling solutions with no haze or color, and its availability in granular form in order to minimize dusting and lumping during handling, as well as to improve dispersibility upon addition to water.

The highest viscosity type possesses a viscosity in excess of 20,000 cps. at 2% concentration. This material is useful for thickening and stabilizing all types of aqueous systems, and is relatively unaffected by the presence of salts, acids, or alkalies in solution. Excellent compatibility with gums and latices renders it a preferred thickener in water-based emulsion paints and latex emulsions for adhesives and coatings.

The low-viscosity types are used as polymerization stabilizers in the preparation of vinyl acetate homopolymers and copolymers.

Hercules Powder Co., Dept. PVP, 900 Market St., Wilmington 99, Del.

STAPLER
For Closing Filled Cartons

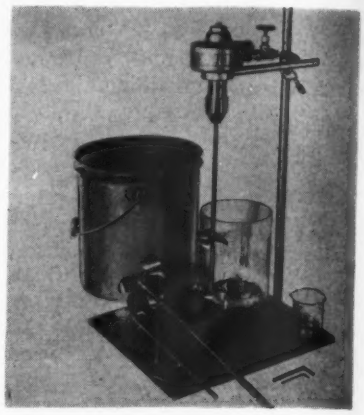
New "Clip-Top" Packer—Model P—(pneumatic) closes filled cartons from the outside with king-size staple clips.

In addition, this machine sets-up empty containers, ready for packing. It seals any ordinary box for less than 1/3 of one cent.

Design uses a diaphragm chamber which requires no lubricator, no filter, nor regulator, because it has only one moving part which develops no friction.

The adjustable anvil staples A, B, or C flute corrugated board. A simple twist of the adjustor screw automatically controls the staple clip for any flute thickness.

Container Stapling Corp., Dept. PVP, 27th St. & I. C. R. R., P. O. Box 247, Herrin, Ill.



FAWCETT

STIRRER
Air-Driven

Laboratory air–driven stirrers now being offered. The unit is air operated from 30 to 90 lbs. pressure and is claimed to meet all safety requirements.

The unit has needle valve control. A turn of the hand wheel gives the exact speed required, from 40 to 2000 R. P. M. High torque at low speeds is claimed.

The stirrer, by slowly opening needle valve, can be brought to desired speed without sudden jump in R. P. M. Unit can be stalled indefinitely without damage to motor and without heat.

M. W. Fawcett Co., Dept. PVP, Macedonia, Ohio.

STIRRER
Variable Speed

Laboratory motor stirrer is said to be capable of stirring viscous liquids at high or low speeds.

Variable speed unit provides consistent stirring action at selectively controlled speeds ranging all the way from 100 to 1500 rpm. Speed is regulated easily by a control knob on the face of the 1/50 hp induction motor, without governor or rheostat.

CENTRAL SCIENTIFIC

Powerful stirring is claimed to be accomplished by a high torque transfer which permits the stirring of viscous liquids at full speed. The torque increases when speed is reduced, thus providing added power when it is needed most.

The stirrer is equipped with a three-jaw Jacobs' type chuck for quick change of metal or glass stirring rods ranging from 1/4 to 3/8-inch diameters. The selected stirring rod is mounted in a hollow shaft with unique gripping and centering mechanism which helps maintain alignment, reduces whipping, and permits fast and easy adjustment to any desired height.

An added feature of the new stirrer is a special rod for mounting in a right angle clamp on the support stand. This method of support permits pivoting of the unit for stirring at various angles.

The induction type motor contains no spark-producing brushes, thus eliminating danger of explosions. The motor operates on 115 volts, A. C., 50/60 cycles.

Central Scientific Co., Richard S. Smith & Associates, Dept. PVP, 176 W. Adams St., Chicago 3, Ill.

STRAINER
Flow Capacity of 1000 GPH

Now available for liquid lines is the stainless steel line strainer. Unit has been designed for filtration of fluids containing foreign solids. It has a rated flow capacity of 1000 gph with maximum view glass pressure of 50 psi. Overall size of assembled unit is 6½ x 6½ x 13" high.

Strainer is made "to clean in place" by opening clamp fitting at top and removing the filter screen. Air vent adjustment permits easy releasing of air bound lines.

It can be supplied with inlet and outlet fittings to specification.

Terriss Division, Consolidated Siphon Supply Co., Inc., Dept. PVP, 22 Wooster Street, New York, N. Y.

SURFACE AGENT
Corrosion Inhibiting

Cationic surface active agent, RD-2873-P is claimed to display excellent corrosion inhibiting, bactericidal and foaming properties.

RD-2873-P is a 40 per cent active isopropanol solution that is soluble in water, benzene, hexylene glycol and carbon tetrachloride. It has a pour point of less than 0°F.

The chemical effectively reduces corrosion of steel in water systems. Small additions of RD-2873-P to aerated solutions prevents rusting or etching of mild steel cylinders at room temperature, whereas specimens in untreated solutions become heavily rusted.

RD-2873-P effects nearly complete control of microorganisms found in cooling water. Total growth inhibition in a mixed culture of algae was obtained with 0.01-0.02 per cent of the chemical.

Aqueous solutions of RD-2873-P produce large quantities of stable foam. Hard water, high salt concentrations and varied solution temperatures show only slight effect on volume and stability of foam.

Armour and Company, Chemical Division, Dept. PVP, 1355 West 31st Street, Chicago 9, Ill.

SUSPENSION SCALES
Calibrated to 1/10 of 1 Per Cent

New line of automatic suspension scales, embody a number of advancements that makes it of particular value in industrial applications.

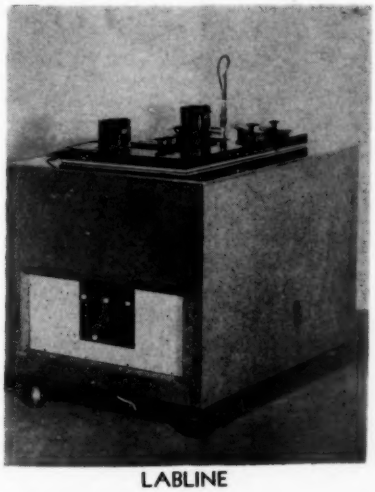
Most important feature lies in the accuracy of this new unit. It is calibrated with certified test weights to an accuracy of 1/10 of 1% and is officially sealed by the Bureau of Weights and Measures prior to shipment.

Model P has a highly legible, 16" diameter dial and is available in the following capacities: 0-250, 0-500, 0-750, 0-1000, 0-2500, 0-5000, 0-7500 and 0-10,000 pounds. Principle of operation is based upon compound levers. The mechanism is fully dampened against vibration or flutter. Safety factor is 5-1 in capacities up to and including 5000 pounds and better than 3-1 in the 7500 and 10,000 pound ranges.

A convenient reset or tare adjustment knob is provided on the Model P so that weight of slings, pallets or chains may be quickly and easily canceled out. A further refinement is claimed for the ball bearing swivel hook which revolves freely under maximum load a full 360° in either direction. In addition, it will arc 27° to accomodate material pickup at an angle.

Model P scales have a net weight of 56 pounds and thus can be readily carried by the operator to various plant locations where needed. Being temperature compensated, they are unaffected by the extremes of foundry room heat or the sub-zero of outside storage yards. In addition to hoist or crane applications, they may also be utilized with fork lift trucks.

W. C. Dillon & Co., Inc., Dept. PVP, 14620 Keswick St., Van Nuys, Cal.



LABLINE

TEMPERATURE BATHS
Maintain ± 0.1°C. Accuracy

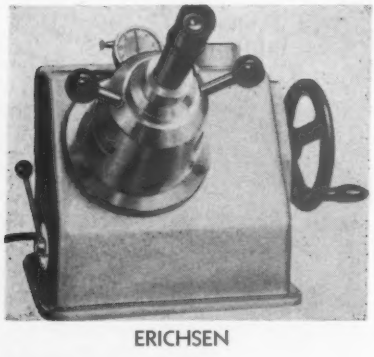
New line of variable temperature baths test diodes electronic components, thermostats, and other equipment that requires highly accurate testing conditions. These conditions are secured with ther-

mistor controls capable of maintaining temperatures within ±0.1°C. accuracy. The thermistor controls are mechanically unbreakable.

The Produc-temp Baths, as they are called, may be had as individual units each adjustable to 100°C., 25°C., or −55°C.; or as a combination bath with a temperature range from 100°C. to −55°C. The variable temperature bath is controlled by ten separate thermistor controls, so that complete programming of temperature changes is achieved. Silicone fluid, No. 200, because of its chemical inertness, heat resistant properties and uniform viscosity, is the recommended liquid.

All units have stainless steel interiors, cold-rolled steel exteriors and recessed control panels. Units are fitted with 2-1/30th H.P. circulators; overall dimensions are 46″ long, 36″ wide and 38″ high. Combination units are agitated with motors of 1 H.P., and have a circulation of 150 gallons a minute.

Full information and prices are available from Labline, Inc., Dept. PVP, 3070-82 W. Grand Avenue, Chicago 22, Ill.



ERICHSEN

TESTING MACHINE
For Lacquer & Paint

New machine is a specially designed manual-hydraulically driven lacquer and paint testing machine to enable the user to carry out the Erichsen Cupping Test. The test result is observed visually, either directly or with the help of a microscope with built-in lighting.

Specimens up to one mm thick can be drawn on Model 229 by easy turning of the handwheel with the operator sitting in front of the machine. The specimen, and also the depth indicating dial gauge, can be observed directly from this sitting position. By moving the control lever on the lefthand side, the punch immediately returns to the the starting position. Quick and exact tests are said to be obtained.

A. M. Erichsen GMBH, Hemer-Sundwig/Westf., Germany. Representative: Richard Schachne, Dept. PVP, 545 Fifth Ave., New York 17, N. Y.

DESPATCH

TESTING OVEN
Features Observing Work

Experimental and testing oven offers features for observing work in chamber. According to the company, this oven equipped with an inner glass door, allows operator to observe his product while it is in the oven. This feature is said to benefit such experimental and testing work as: baking finishes on metal, plastic, cloth and other products that should not be removed from oven during baking period.

Further aid to better observation of individual samples while in the oven is provided by revolving sample holders. These sample holders placed at ends of seven extension rods can be rotated so that any desired sample can be placed before the viewing door. This permits inspection without opening door and without altering temperature on other samples.

Oven has vertical flow convection heat. Two swing type high temperature glass inner doors. External knob with indicating numbers to mark special samples to facilitate selecting samples for viewing. Cabinet is available in stock sizes I. D. 24″ x 24″ x 18″ to I. D. 38″ x 42″ x 45″.

Despatch Oven Co., Dept. PVP, 619 S. E. 8th St., Minneapolis, Minn.

FENWAL

THERMOSTAT
Explosion Proof

Explosion proof thermostat, UL approved for Class 1, Group D hazardous areas, has been announced.

Said to be designed for convenient immersion in tanks, wall installation, and for exposure to contaminated environments, the unit is made up of three subassemblies: a Series 47000 Thermoswitch unit, stainless steel well, and an explosion proof junction box that completely protects the lead wire outlets.

The unit is completely adjustable over a 32°F to 500°F range, and can be exposed indefinitely to -100°F, or, for short periods, to 100°F above its set point. Current rating is 10 amps 115 VAC, or 5 amps 230 PAC.

Fenwal Inc., Dept. PVP, Ashland, Mass.

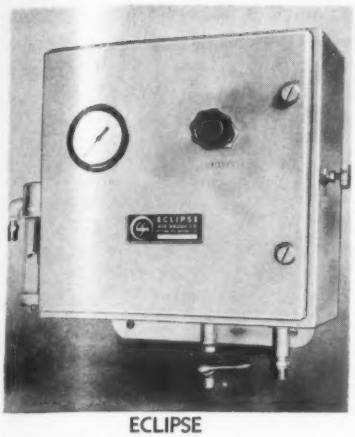
TIMER
Installed on Spray Equipment

New compressed air operated timer which can be quickly installed on automatic or semi-automatic spray equipment has been announced.

Although the timer was developed for spray painting cycles (½ - 30 seconds) it is particularly well suited to control any operation in explosive, abrasive, or corrosive atmosphere.

The timer is initiated by just a pulse of compressed air from a manual or cam operated valve supplied with the unit. An important feature of this timer is that its cycle is repeatable within 10 per cent regardless of variations in the initiating pulse.

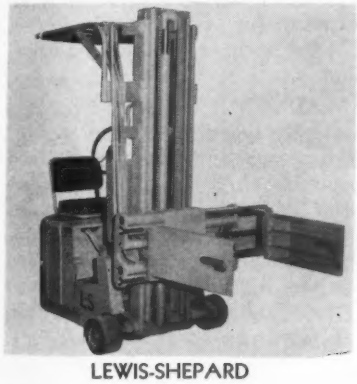
The unit is supplied in a steel box



ECLIPSE

and includes a filter oiler to provide long trouble free operation. Installation is so simple that only a wrench is needed to connect a compressed air supply.

Eclipse Air Brush Co., Dept. PVP, 390 Park Ave., Newark 7, N. J.



LEWIS-SHEPARD

TRUCK

Bale Grab Arms

A new load grab with bale grab arms is now available.

Said to be ideal for the small warehouse, light duty bale handling operation, the minimum overall truck weight and excellent maneuverability offered by this Model "J" with cascade bale clamp, makes it suited for operations in old style warehouses where floor loading capacities and maneuvering space pose major problems.

The bale grab arms are quickly detachable and can be quite easily interchanged with a wide variety of cascade arms, thus making it possible to handle many different types of loads.

Lewis-Shepard Products, Inc., Dept. R9–7–PVP, 125 Walnut Street, Watertown 72, Mass.

VAC-U-LIFT

TRUCK ATTACHMENT

Adjustable Pads

New, improved, low cost fork truck attachment utilizes vacuum for fast, safe, economical handling of barrels, plate, sheet or stone.

The attachment is ruggedly conconstructed and entirely self-contained with four 10″ pads mounted directly to the frame which slips easily onto the forks of the truck. The pads are adjustable from 19″ to 29″ the long way of the fork, and from 20″ to 28″ between the forks. Lifting capacity of each pad is 500 lbs. a total capacity of 2,000 lbs.

Power is furnished by a gasoline engine which drives the vacuum pump and contains its own patented reserve vacuum system to assure safety in the event of an engine failure. The pendant control panel is in easy access to the truck operator.

Optional equipment includes an electric starter for the gasoline engine or various size beams for larger material handling. The fork truck attachment is now in production and is available for prompt delivery.

The systems are currently used to handle materials from a few ounces to several tons and are used extensively in handling steel plate, tanks, concrete, structural steel, glass, as well as many other nonporous materials.

Vac-U-Lift Co., Dept. PVP, Salem, Ill.

TUNG OIL

Fortifying Plasticizers

The commercial availability of "Polytung Oil" has been announced. It is a pure tung oil processed by a high temperature thermolizing operation which produces unusually good results in clear oil protective coatings or cold cut varnishes.

Said to be miscible with many normal oil insoluble resins, it lends itself particularly well to fortifying plasticizers for vinyls, chlorinated rubber and cellulose coatings.

Degen Oil & Chemical Co., Dept. PVP, Box C, Greenville Station, Jersey City 5, N. J.

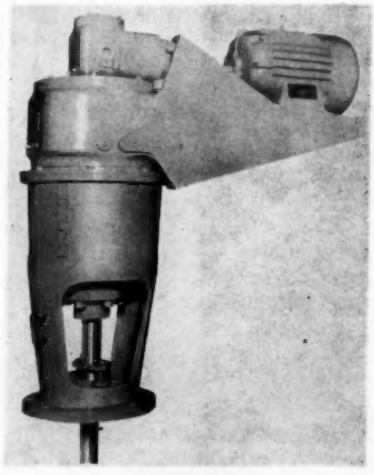
TURBINE AGITATORS

Features Wide Flexibility

Said to feature flexibility in meeting a wide variety of process requirements from inventoried modular components, the Moduflex line of turbine agitators has been developed.

Five basic gear-drive configurations are available in sizes through 75 hp.: right angle head, belt driven, in-line with coupled motor, in-line with integral motor and variable speed.

Gears in Moduflex drives are flame-hardened chrome-moly steel with teeth ground after hardening for quiet operation. To prevent harmful dynamic deflection, the shaft has a generous cross section and is rigidly supported by closely spaced spherical and tapered roller bearings. This design improves critical frequency to the point that standard Moduflex agitators can be used for most applications which formerly required steady bearings.



CHEMINEER

Lubrication of all moving parts in the gear case is provided by a positive oil pump. A dry-well seal prevents leakage.

In addition to choice of material for wetted parts, three standard impeller styles are offered: straight blade, curved blade, and 45° pitched blade.

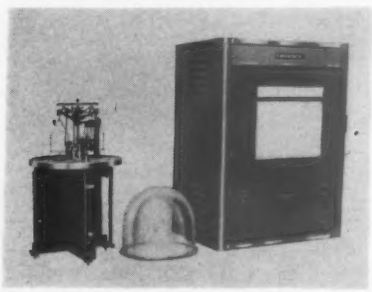
Chemineer, Inc., Dept. PVP, 1042 E. 1st, Dayton, Ohio.

UNSATURATED ALCOHOL
High Heat Resistance

A new, reactive unsaturated alcohol, Cyclol, is for the first time being offered in commercial quantities to the chemical industry. Cyclol is a product of Interchemical research and is now offered for general sale as part of Interchemical's diversification into new but related fields of chemical activity.

Interchemical Cyclol—a stable water-white liquid—combines in a single structure a reactive double bond and a primary hydroxyl group. Chemically, Cyclol is 2-hydroxymethyl-5-norbornene. It can be utilized through reaction of the hydroxyl group, the double bond, or both, to yield many useful products.

Cyclol is suggested for the modification of condensation and addition polymers for use in coatings, plasticizers, lube oils, adhesives and leather, textile and paper finishes. Modification with Cyclol serves to improve the compatibility, pigment wetting and heat and chemical resistance of these polymers. Derivatives of Cyclol may find possible use in odorants, insecticides, pharmaceuticals and other compounds. Cyclol is a powerful high-boiling solvent and is miscible with most common solvents. Interchemical Corp., Dept. PVP, 67 W. 44th St., New York, N. Y.



AINSWORTH

VACUUM BALANCE
Semi-Micro and Analytical Models

New automatic recording vacuum balance is said to be able to weigh samples in air or inert gases; at atmospheric or reduced pressures; at room or higher temperatures; on the balance pan or suspended below the balance in a furnace for thermogravimetry or differential thermal weighing.

Weights are built into the balance and are operated by controls outside the vacuum chamber. The recorder, developed last year for use with standard analytical balances, charts weight, or weight and temperature against time.

The vacuum balance is available in semi-micro and analytical models. The semi-micro unit has a capacity of 100 g., sensitivity of 1/100 mg., and a range of automatic weight operation of 400 mg.: the analytical, 200 g., 1/10 mg., and 4000 mg. respectively.

Wm. Ainsworth & Sons.,Dept. PVP, 2151 Lawrence St., Denver, Colo.

VACUUM PUMP
Easy to Clean

New easy-to-clean vacuum pump handles liquids up to the consistency of syrup, as well as powdered solids that have a tendency to "slump" or seek their own level. Lift of the pump, it is stated, is approximately 25 feet of water at sea level. Material passes through sanitary tubing from the sampling source directly to the sample container reportedly never coming in contact with any part of the pumping unit. It reaches spots that are inaccessible to other pumps.

Motive power is provided by the vacuum created in the sampling container on the up-stroke of the pump handle, it is pointed out. Easy cleaning and low maintenance are additional advantages listed. W & W Manufacturing Co., Dept. PVP, 1518 E. Grove, Midland, Mich.

VACUUM SYSTEM
Quick Pump-down

New vacuum system unit produces any desired moderate vacuum (250 mm down to 0.5 mm) and automatically holds it within ±0.2 mm, in an air-tight system. One gets a superior vacuum to that of most house lines, and none of the erractic fluctuations that disturb such sources.

The unit uses a ½-hp, two-stage Welch Duo-Seal vacuum pump, running at 525 rpm, with a free air capacity of 58 liters/minute. Large valve openings and connections speed pump-down. Fisher Scientific Co., Dept. PVP, 384 Fisher Building, Pittsburgh 19, Pa.

VALVE
Stainless Steel

New valves are offered with handwheel for manual operation (where the amount dispensed may be determined by the handwheel travel), and motor-operated with pulley, sprocket wheel, or flexible shaft drive for remote or process-controller operation on constant or cyclic flows.

The unit represents features of design which offer rapid and complete accessibility to bearings and gear train. It regularly features standard 150 lb. ASME 3 in. flange on suction side for connection to tank, reactor, etc. Tapered conical suction port design offers minimum resistance to sluggish media. Threaded discharge port is ¾ in. Stuffing box is accessible for replacing without dismantling valve, and can be repacked while in system without leakage.

The valves are offered in type 316 stainless steel, ni-resist, and aluminum. Gears are of stainless steel, Hastelloy C or B, ni-resist, monel, or nickel, with replaceable carbon or ceramic wear plates and carbon, self-lubricating bearings.

Eco Engineering Co., Dept. PVP, 12 New York Ave., Newark 1, N. J.

VARNISH
Fungicidal, Insulating

A clear, fast air-drying insulating varnish, said to protect electrical and electronic equipment from fungus attack, has been developed.

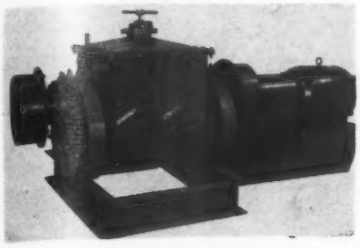
Designated No. 642-AF Fungicidal Insulating Varnish by the firm, it is applied to the surface of instruments, transformers, printed circuits, ceramic resistors, insulators and other electronic equipment subject to fungus attack in hot, humid climates.

Application of the new varnish to the surface of such equipment prevents the growth of fungus which causes surface leakage and potential arc-over paths. Failure of shipboard, aircraft and ground installation equipment which must operate in the tropics is thus minimized.

No. 642-AF Varnish is water

white in color, will not "afteryellow" and is, therefore, ideal for application over stamped or painted identifying numbers, it was said.

Schenectady Varnish Co., Inc., Dept. PVP, Schenectady, N. Y.



SCHUTZ-O'NEILL

VIBRATING BALL MILLS
High Velocity Vibration

New line of German-made vibrating ball mills which pulverize, micronize and mix to critical standards a wide range of materials in either wet or dry state is now being offered to North American industries.

Adaptability of the new mills to milling and mixing requirements of many different types of raw and process materials, regardless of abrasiveness, hardness, toughness or compactness, plus higher output with reduced milling time as compared to conventional ball mills, and low operating cost, are advantages claimed by the manufacturer for these machines. The complete line includes six batch-loaded mills (from a one pint laboratory model to a 55-gallon production model) and four continuous system models which may be used in conjunction with external classifiers for maximum output with critical levels of fineness.

The new machines, said to be a major advance in machinery for particle size reduction and homogeneous mixing, employ a principle of intense, high velocity vibration which forcibly agitates the milling medium in the grinding chamber to reduce the material being processed by crushing, shearing, grinding and attrition. Milling media and chamber liners are readily changed to adapt the mills to the particular requirements of various materials.

The mills are in widespread use in Germany and other parts of Europe.

Schutz-O'Neill Co., Dept. PVP, 311 Portland Ave., Minneapolis, Minn.

VIBRATOR
Produces Straight Line Vibration

New dual motor vibrator-geared for synchronous action, produces straight line vibration, in any direction. This unit operates on a rotating eccentric weight principle and features adjustable eccentrics, permitting force of vibration to be varied without changing weights. There are four weights, two on each motor, contra-rotating. Variable impact range is from 640 to 2200 pounds and any impact change can be made in a matter of minutes. Because there are no pulleys or belts within this totally-enclosed vibrator, operation is practically noiseless. Ideal for heavy duty applications requiring continuous flow of weight bulk materials. . . prevents sticking, arching or bridging.

Specifics include: weight, 100 pounds; dimensions: width 12-5/8 inches; length 12-5/16 inches, and thickness 7-1/8-inches. Input is 1000 watts, and Model RC-31 is obtainable for 220-volt, a-c,. 3-phase, 60 cycle power. Cleveland Vibrator Co., Dept. PVP, 2827 Clinton Ave., Cleveland 13, Ohio.

DEWEY & ALMY

VINYL GELLED PAINT
Non-Drip

A formulation for a water base vinyl gelled paint refuses to drip from brush or roller.

The new formulation, a white interior gelled paint, is based on the firm's Everflex GT vinyl acetate copolymer.

The thixotropic paint has a stiff consistency in the can, but flows smoothly onto surfaces in a coat scarcely thicker than a conventional latex paint.

Gelled paint is said to also eliminate the fear of tipping over the paint can that inhibits many do-it-yourselfers. Vinyl-based gelled paints flow out of the can very slowly, if at all.

Dewey & Almy Chemical Division, W. R. Grace & Co., Dept. PVP, 62 Whittemore Ave., Cambridge 40, Mass.

VINYL PAINT
Interior/Exterior Masonry

A new vinyl masonry paint that does not require pre-wetting of porous masonry surfaces has been announced.

The paint is made for exterior or interior masonry surfaces and may also be used as a stipple paint.

The new paint contains Polyvinylacetate, cement, pigments and other additives that act as built-in surface conditioners.

Besides eliminating pre-wetting requirements, the new paint, it is claimed, has been proven to have greatly increased hiding ability. Where two or more coats of paint had been necessary in the past, one coat of this new paint will often cover masonry equally well.

Mixed with water the paint can be directly applied with brush, roller, or paint sprayer. Named Hylite Instant Vinyl Masonry Paint, it is available in white and in a number of modern colors.

Carbola Chemical Co., Dept. PVP, 58 Harris Rd., Natural Bridge, N. Y.

VINYL PLASTICIZERS
For Use in Vinyl Plastics

Two new epoxy-containing plasticizers for vinyl resins are now being produced in pilot plant quantities.

The new compounds, Flexol plasticizers 107-D and 163-D, function both as plasticizers and as vinyl chloride stabilizers. They are completely compatible with vinyl chloride resins even at concentrations as high as 70 parts of plasticizer per 100 parts of resin.

Flexol plasticizer 107-D, which chemically is di(2-ethylhexyl)-4,5-epoxy tetrahydrophthalate, is quite similar in plasticizing properties to dioctyl phthalate. The principal differences, which are attributed to the presence of the epoxy group, are that it is less volatile and has stronger solvating power and a somewhat higher brittle temperature. It imparts long-term stability

to vinyl compositions and is highly resistant to fungus attack.

Flexol plasticizer 163-D, chemically named di(iso-decyl)4,5-epoxy tetrahydrophthalate, is similar in plasticizing properties and structure to di(iso-decyl) phthalate. However, it is even less volatile and more resistant to extraction by oil than di(iso-decyl) phthalate. The new plasticizer is also a good heat and light stabilizer for vinyl chloride resins and is not susceptible to fungus attack.

Both plasticizers are particularly suitable for use in vinyl plastics where superior resistance to outdoor weathering is required. These new products are also potentially useful as acid acceptors for chlorinated solvents and as plasticizers for nitrocellulose coatings.

Union Carbide Chemicals Co., Dept. PVP, 30 E. 42nd St., New York 17, N. Y.

BRABENDER

VISCOSIMETER

Fifteen Paddle Designs

New, fully recording, completely linear viscosimeter measures viscosity of practically all fluids such as epoxies, gels, starches, inks, paints, plastisols, chocolate, catsup, glues, oils, tars, pastes, clay, milk, cements, etc. Changes in viscosity are automatically recorded providing useful information from the plotted curves. Conversion from Brabender units already in use to other viscosity units may be readily made, since the new instrument is completely linear.

Other features of the viscosimeter, according to the company include a stepless variable speed drive (20 to 200 rpm), disposable paddles and sample containers and interchangeable tension spring cartridges from 125 to 2,000 cmgms.

C. W. Brabender Instruments, Inc., Dept. PVP, South Hackensack, N. J.

VISCOSITY TUBES

Bubble Time Method

ASTM "timer" tubes are made of clear glass. One end is open, the other has a flat bottom. The inside diameters of these tubes are held within a tolerance of 10.65 ±0.025 mm. Outside length equals 114 mm. ±1 mm. Plainly legible rings are located at distances from the bottom as follows: 27 ±0.5 mm.; 100 ±0.5 mm.; 108 ±0.5 mm.

The distance between the first and second ring is 73 ±0.5 mm. The bubble speed of the liquid is timed between these two rings. The distance between the second and third ring is 8 mm. ±0.5 mm. These rings are used as guides to form a bubble of proper size.

A special revolving tube holder is available for use with the tubes. After filling and corking the tube, it is placed in the holder and retained by means of two spring clips. The tube holder, which is constructed of all nickel-plated brass, is then immersed in the water bath. To invert the tube, pull the plunger knob upward.

Leveling of the tube holder is accomplished by means of built-in adjusting screws and a bubble level.

Positioning of the tube in the true vertical is mandatory. A tube one radious off the vertical will give results that are 8-10% lower. If the tube is one diameter off the vertical, the results will be 20-25% lower.

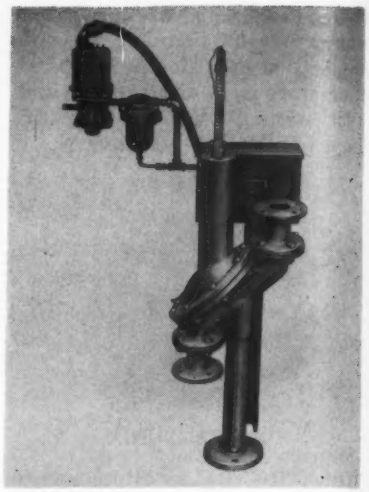
Gardner Laboratory, Inc., Dept. PVP, P. O. Box 5728, Bethesda 14, Md.

VOLUME PUMP

For Slurries or Solutions

A controlled volume pump, utilizing the Oliver Diaphragm Slurry Pump design principles, has been made available.

Modifications to the O. D. S. pump include the inclination of the pump chamber to eliminate entrained air from the body automatically. Also, to obtain highest slurry metering accuracy, the modified design features especially engineered double ball check assemblies.



MILTON ROY

The new pump consists of two hemispheres clamped together with a slack diaphragm between. The lower hemisphere is equipped with inlet and outlet check valves. The upper hemisphere is connected to an air supply by means of a three-way solenoid valve which alternately pressurizes and exhausts the chamber. A timer electrically operates the three-way valve.

When the upper hemisphere is exhausted, suction pressure forces liquid into the lower hemisphere through the suction ball checks. This action displaces the diaphragm upward. When the upper hemisphere fills, it is pressurized, and the downward movement of the diaphragm forces the liquid from the lower hemisphere through the discharge ball checks.

By an easy adjustment of the timing mechanism, it is possible to vary flow volume from 0 to 180 gallons per hour. In addition, stroke length can be regulated by a unique electrical probe mechanism.

Milton Roy Co., Dept., PVP, 1300 E. Mermaid Lane, Philadelphia 18, Pa.

WALKIE TRACTOR

For Short Runs, Confined Areas

New electric tractor is a walkie-type model that can also be used as a standup rider when desired. Re-

commended for economical movement of stock and merchandise in plants and warehouses, it is suited especially for short runs and for use in confined areas where rapid movement of trailer loads is demanded. Free of exhaust fumes, it is suitable for use where air contamination is prohibited.

The short turning radius, narrow width of 27½" and length of only 46¾" without the coupler makes the tractor highly maneuverable and easy to handle. The tractor operator will like its quick response through 2-speeds forward and 2-speeds reverse, with pushbutton type controls placed at finger's reach on the steering handle. A 7" high platform allows the operator to ride and steer the truck easily without fatigue or the effort of walking along with the vehicle.

The new tractor features a new gear drive designed as a single package unit with drive motor, transmission, drive wheel and brake mounted in a vertical column and held to the truck chassis with only four bolts.

Powered by a 12-volt battery, the tractor has ultimate drawbar pull of 550 pounds with rolling capacity of 10,000 pounds. The spring-loaded steering handle applies a 7" automotive brake when placed in vertical or horizontal position. A switch prevents forward-reverse drive power from being applied while the brake is on. Wheels are rubber tired for positive traction. Weight is 910 pounds without battery.

Barrett-Cravens Co., Dept. PVP, 628 Dundee Rd., North Brook, Ill.

WATER SOLUBLE OIL
For Metal Baking Primers

New Kelsol 1209 is water thinned and thinnable, with no emulsifiers or additives required, the company reports. Excellent spraying at varying viscosities is claimed as well as full flow without sag in dip applications.

It is said to be resistant to salt corrosion, water and humidity. Company says the new formulation reduces fire hazard. Spencer Kellogg and Sons, Inc., Dept. PVP, Buffalo 5, N. Y.

WET FILM APPLICATOR
17 Different Path Depths

An eight-path wet film applicator

PRECISION GAGE

is now available in nine different models having a total of 17 different path depths and three different path widths.

Ranges covered by the nine models are: .0005", .001", .0015", .002", .003", .004", .005", .006", .007", .008", .010", .015", .020", .025", .031", .040", and .050". These instruments said to be accurate to 1/10,000 of an inch and are used in conjunction with hiding power charts, plate glass, or on any other plane surface, to determine hiding power of paints, enamels, lacquers, technical coatings, and other materials which require such determination.

The depths of paths are fixed, i.e., they are calibrated in the actual depths. This feature affords a true reading of film thicknesses of all films since materials will vary in shrinkage according to their thixotropic properties and/or rheological qualities.

Precision Gage & Tool Co., Dept. PVP, 320 E. Third St., Dayton 2, Ohio.

YELLOW PIGMENT
For Protective Coatings

A clean primrose shade yellow pigment, Strontium Chromate 12170, has been made available.

The principal use for Strontium Chromate 12170 is in metal protective coatings, as its rust inhibiting properties are said to prevent the corrosion of steel, aluminum and magnesium. Strontium Chromate is only very slightly soluble when used in a primer, but sufficiently so to yield an adequate concentration of inhibiting ions to metal surfaces, thus retarding corrosion.

The outstanding property of Strontium Chromate 12170 is claimed to be its low reactivity in high vehicles, such as catalyzed epoxies. It produces little or no increase in body in such vehicles, whereas Zinc Chromate produces serious body increase in high acid vehicles. In many cases, formulators have found that an ideal combination of properties can be obtained with mixtures of Strontium Chromate and Zinc Chromate.

Pigment, Color & Chemical Division, Sherwin-Williams Co., Dept. PVP, 260 Madison Ave., New York 16, N. Y.

ZINC OXIDES
Improved Dispersion Properties

A new series of zinc oxides for the paint industry which feature improved wetting and dispersion characteristics has been announced.

Dispersion of the new oxides in typical house paint vehicles demonstrate that Hegman Gage readings of 4 can be obtained in a cowles dissolver in less than one minute, the company reports. According to the manufacturer, no other zinc oxide tested achieved the same degree of dispersion in less than 15 minutes.

St. Joseph Lead Co., Dept. PVP, 250 Park Ave., New York 17, N. Y.

ZINC STEARATE
For Use in Sanding Sealers

New stir-in zinc stearate, for use in sanding sealers, has been announced.

The new sealer is a fine, white powder that can be mixed, without grinding, in either lacquer or thinner to produce effective sanding sealers.

According to the manufacturer, the new product offers many advantages not found in competitive sealer components:

1 - It stirs more readily into the sealer.
2 - It produces a film having a finer degree of dispersion.
3 - It has a slower sedimentation rate.
4 - It has better color.
5 - It has less gumming effect on sandpaper.
6 - It allows proper sanding in 20 to 30 minutes after application.
7 - It does not effect the water resistance of the sealer.
8 - It is bloom resistant.

Metasap Chemical Co., Dept. PVP, 60 Park Place, Newark, N. J.

News about

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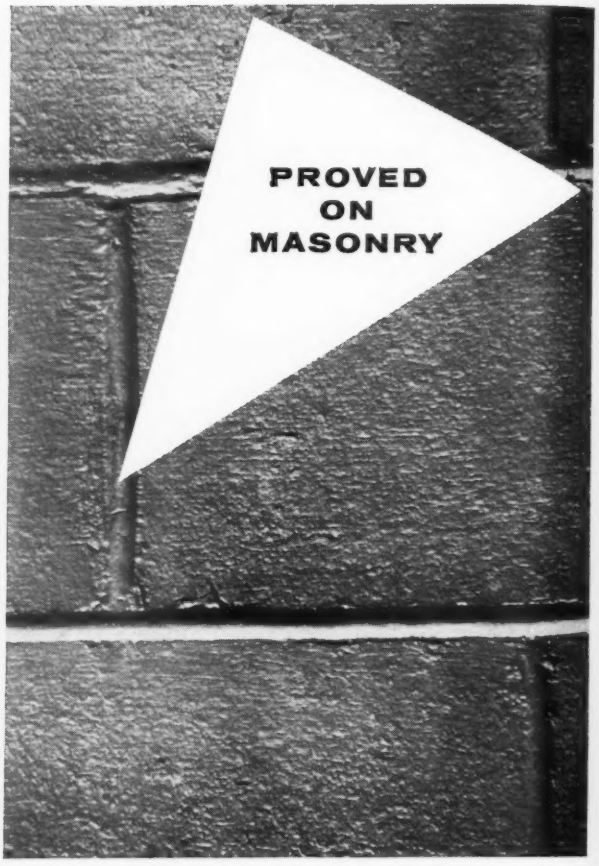

How Geon vinyl chloride-acrylic latex produces outstanding paint formulations

Here are two examples of paint formulations using Geon 450X3, a vinyl chloride-acrylic copolymer. The house at left was painted 3½ years ago. The building at right was painted four years ago. These two formulations made from a single Geon base demonstrate manufacturing advantages and on-the-surface results like this:

- **simplified paint manufacture because binder is internally plasticized**
- **excellent stability and uniformity**
- **excellent adhesion to wood and masonry**
- **exceptional durability and weatherability**
- **tough, flexible tack-free films with outstanding pigment binding ability**
- **waterproof to exterior penetration, yet permits escape of interior moisture**

Get more information about the excellent performance and versatility of this unique Geon copolymer. Or learn more about how Geon can help you in other ways to improve products and open new markets. Write for the new Booklet telling about use of Geon in paint formulations. Dept. GP-2, B.F.Goodrich Chemical Company, 3135 Euclid Avenue, Cleveland 15, Ohio. Cable address: Goodchemco. In Canada: Kitchener, Ontario.

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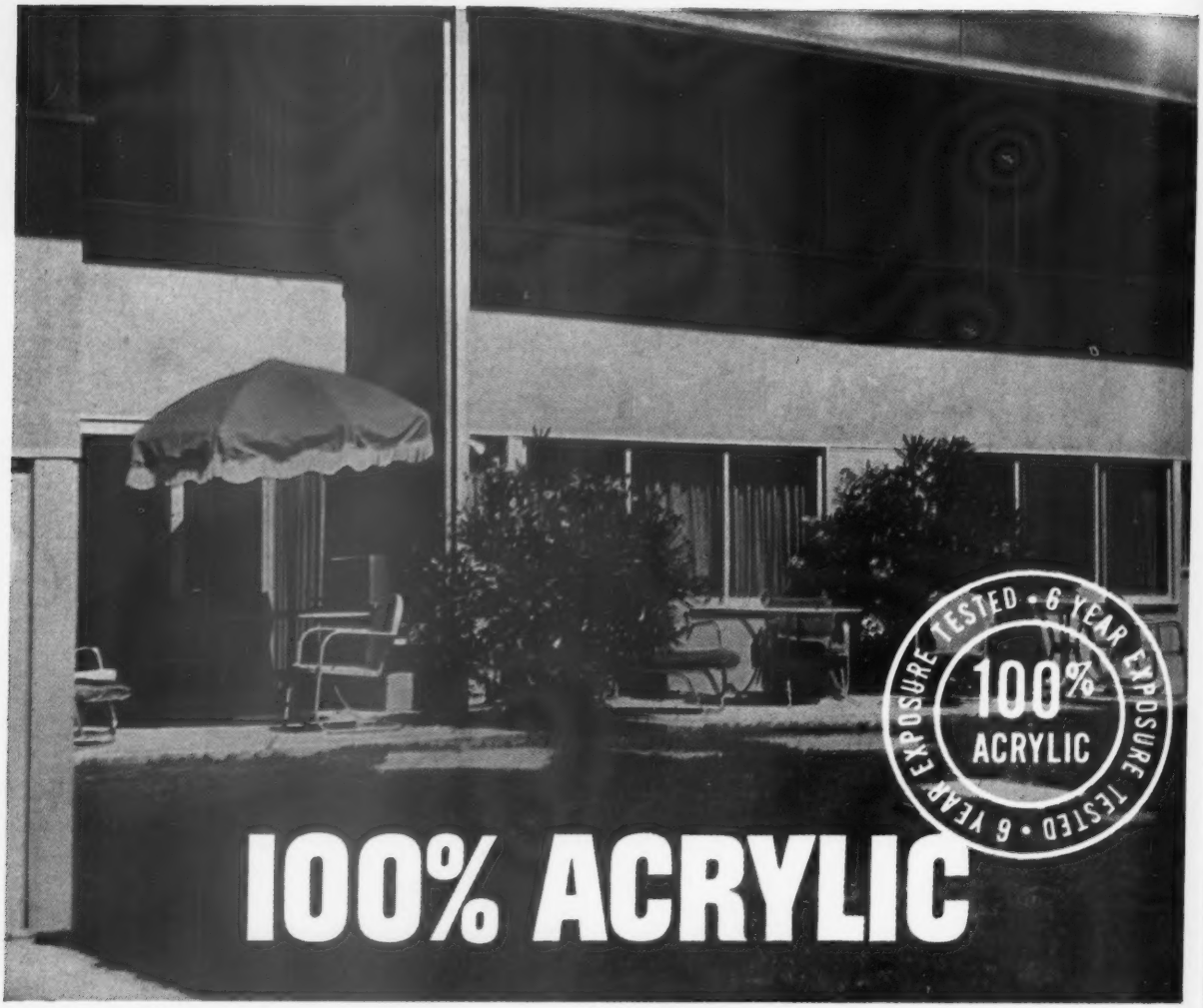
GEON vinyls • HYCAR rubber and latex • GOOD-RITE chemicals and plasticizers

For more information circle No. 9—last page

World Wide REVIEW of 1959

Forty-One Publications Covered

Comprises Cver 600 References



6½ years' weather hasn't harmed this paint

The light gray paint on this apartment building near Los Angeles was applied in May, 1953. In the close-up view, note the absence of chalking and the remarkably good condition of the paint film after over 6½ years of exposure to California sun at a beachfront location. And what's more, the paint has retained its original color.

When this paint was made over 6½ years ago, the vehicle used was the 100% acrylic emulsion, RHOPLEX AC-33—the same RHOPLEX AC-33 Rohm & Haas produces today. This makes RHOPLEX AC-33 the most thoroughly tested and proved product of its kind available to the paint industry.

Other advantages imparted to paints by acrylic emulsion vehicles include easy application by brush or spray over masonry or previously-painted wood, good resistance to blistering, fast drying for a faster second coat, and easy cleaning of equipment with soap and water. But only 100%-acrylic RHOPLEX AC-33 can offer a full measure of these advantages in combination with a 6½ year record of proven outdoor durability.

Write for *Progress Report No. 6* for formulating information, and test data on paints made with RHOPLEX AC-33.

Closeup of painted surface. Note virtual absence of weathering.

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For more information circle No. 10—last page

PUBLICATIONS

Below are the principal journals used in abstracting items which appear in this Review. Where Chemical Abstract has been used as a source, the abbreviations are those employed by Chemical Abstracts.

Abbreviations	*Full Title*
Aerosol Age	
Air Force Chemical Journal	
Amer. Paint Jl.	American Paint Journal
Anal. Chem.	Analytical Chemistry
Bull. Amer. Soc. Test. Mats.	Bulletin of the American Society for Testing Materials
Chem. Abst.	Chemical Abstracts
Chem. Eng.	Chemical Engineering
Chem. Eng. News	Chemical and Engineering News
Chemical Wee :	
Chemicke Zvesti	
Corr.	Corrosion
Corr. Prev. Cont.	Corrosion Prevention and Control
Corr. Tech.	Corrosion Technology
Electroplating	
Fact. Man. Maint.	Factory Management and Maintenance
Farbe und Lack	
Fette, Seifen, Anstrichmittel	
Ind. Eng. Chem.	Industrial and Engineering Chemistry
Ind. Finishing	Industrial Finishing
Izvestiia Akademii Nauk SSSR, Otdelenie Khimicheskikh	
Jl. Amer. Oil Chem. Soc.	Journal of the American Oil Chemists' Society
Jl. Oil Col. Chem. Assn.	Journal of the Oil & Colour Chemists' Association
J. Polymer Sci.	Journal of Polymer Science
Materials in Design Engineering	
Met. Finishing	Metal Finishing
Morskoi Flot	
Off. Digest	Official Digest of the Federation of Paint and Varnish Production Clubs
Paint Ind.	Paint Industry
Paint Jl.	Paint Journal
Paint Mfr.	Paint Manufacture
Paint, Oil & Chem. Rev.	Paint, Oil & Chemical Review
Paint Tech.	Paint Technology
Paint & Varn. Prod.	Paint & Varnish Production
Peintures, Pigments, Vernis	
Plating	
Product Engineering	
Prod. Finishing	Products Finishing
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7636

For more information circle No. 11—last page

GENERAL REVIEW ARTICLES

PAINT AND VARNISH PRODUCTION, in its "World Wide Review of 1958," cites over 550 references and patents, covering developments in synthetic resins, latex emulsions, drying oils and derivatives, solvents and intermediates, pigments, driers and additives, production, industrial and architectural coatings, corrosion, applications, aerosols, performance testing, and chemical analysis. The review also includes an exhaustive buyers' guide of new equipment and materials.[1]

An extensive review by Brushwell, based also on an anlaysis of the literature of the field, deals with research developments, new products, processing and applications.[2]

Errico reviews the outlook for 1959; his article is not only a forecast, but an analysis of trends and developments in intermediates, synthetic resins, solvents and additives.[3]

A three-part series by Fisk is devoted to paint chemistry. In considerable technical detail, the author reviews theory and basic principles, polymerization mechanisms, shapes and properties of polymer molecules, and condensation polymers.[3a]

A three-part review by Kitchen covers occurrence, processing, and applications of natural resins.[3b]

An informative if somewhat amusingly arranged article by Boyer deals with "generations" of oils, resins, and polymers. Boyer considers drying oils and modifications the "forefathers" of present developments; alkyds he discusses as "third generations," polyesters and epoxies as "recent nephews," thermosetting resins as "stepsons and stepdaughters," celluloses as "first cousins;" rubber he classifies as "the prodigal son," synthetic polymers as "sons and daughters-in-law,"; polyvinyl chloride and polyvinyl chloride copolymers he particularly honors as "a favorite son and family." Among other "relatives" and "orphans" he classifies are plastisols, vinyl chloride copolymers for solution coatings, and latex emulsions.[4]

A very general paper by Long summarizes some of the unsolved research problems in the paint field: among these are finding catalysts or other means of reducing the cost of the esterification process for glycerin; research on specific problems of large molecule compounds; and research on alkyds.[5]

A literature review on emulsion paints is the subject of a paper by McLean.[6] Mikkelson and Somer discuss the application of radioactive isotopes in the paint and lacquer industries.[7]

A number of studies of foreign developments in the paint field should be mentioned. A review in PAINT AND VARNISH PRODUCTION covers British paint advances: unsaturated polyester lacquers, thixotropic paints, emulsion paints, drying oils, zinc paints, dispersion equipment.[8] Recent activity in Australia is covered by Heron[9] and Berryman.[10] The paint industry in West Germany is the subject of a review by Vincentz. He discusses new equipment and raw materials available, briefly outlines new technical achievements, and cites pertinent statistics.[11]

Further information on developments in Germany will be found in three articles by Pearson; a number of researchers active in the field contributed to his series.[11a-b] Sarx, also, writes on the outlook for the West German paint industry.[11c]

Based on new information furnished by Nielson, PAINT AND VARNISH PRODUCTION discusses the paint industry in Denmark.[12] Research and market trends in Sweden, Norway, Denmark and Finland are the subject of a paper in *Paint Manufacture*.[13]

Dr. Emanuele Recchia supplied information for a review of developments in Italy which appeared in PAINT AND VARNISH PRODUCTION. Recchia discusses research goals and activities in various types of finishes.[13b]

Coverage of current Soviet and Iron Curtain research has recently become a feature of PAINT AND VARNISH PRODUCTION. The literature covered by this service is cited under specific subjects in this review.

Wilson describes the status of the paint industry in India. He discusses manufacturing raw materials, and predicts a bright future for the industry.[14]

Somewhat tangent to the field, but of value, is a short listing of macromolecular terminology, by Natta. This cites about 100 terms in English, German, French and Italian.[15]

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Piccolyte is a true polyterpene hydrocarbon resin, neutral and non-reactive. Piccolyte is water, alkali, and acid resistant, with broad solubility and compatibility characteristics. Piccolyte is available in melting point grades from 10°C through 135°C (B & R), solutions in mineral spirits, and anionic emulsion.

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For more information circle No. 12—last page

SYNTHETIC RESINS

LAST year saw considerable activity in all segments of synthetic resins, particularly for industrial application.

In the field of acrylics, a new thermosetting solution resin for industrial application was introduced. This resin cures at 300 deg. F. to hard, glossy films with high resistance to soap, detergents, and food stains. In the field of polymer development, glycidyl methacrylate (GMA) copolymers and their possible use were investigated. Preliminary work revealed that a styrene GMA copolymer cross-linked with phosphoric acid can be used as the basis of an appliance finish which is said to be superior to alkyd-amine systems in such properties as hardness, and resistance to discoloration and staining.

Because of the shortage of the phthalic anhydride caused by the steel strike, considerable interest was generated in alkyds based on isophthalic acid. Cooking procedures for iso-alkyds are quite different than with straight phthalic anhydride types.

Developments in alkyds include: a short oil, non-drying alkyd which exhibits good resistance to weathering; a pure oxidizing oil modified alkyd which sets tack free in about 5 minutes and hardens into a tough glossy finish without baking; a short-oil alkyd designed to be compatible with chlorinated rubber for formulating durable low-cost industrial finishes; a non-oxidizing alkyd of interest to wood finishes is water-white in color, possesses good color stability, compatibility and print resistance properties, and shows sharp appearance after rubbing and polishing.

Through a new processing technique, two new types of epoxy resins were recently made available. One resin is designed for use with amine type curing agents in room temperature curing systems, the other is used with phenolic acid amine resins in baking systems.

Other important developments are: the application of 100%-solid epoxy coating systems through the use of special curing agents—the curing agents eliminate the need for complex metering and mixing devices; low cost epoxy-bitumen coating which exhibits excellent chemical resistance properties.

During the past year, much work was devoted to urethane technology in an effort to improve the handling and physical properties of this vehicle. A one-can urethane coating is produced by polymerizing a diisocyanate with the alcoholysis product of a drying oil and polyhydroxy compound. Linseed oil may be transesterified by heating with glycerine to produce a mixture of mono-and diglycerides. These are in turn heated with the diisocyanate until the isocyanate group are completely reacted. Conventional driers are then incorporated.

A new way to make tailor-made polyester resins was introduced in 1959. The method consists of reacting monoanhydrides with terminal epoxides in the present of tertiary amine to give a linear polyester. It is claimed that this method can be used to make a linear polyester chain of any desired length, of known termination, and containing at regular intervals along the chain various substituents that can react further.

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Solvent	Xylene	"Cello-solve" Acetate	"Cello-solve"	Xylene	Butyl "Cello-solve": Xylene 1:1	Methyl Isobutyl Ketone: Xylene 65:35	"Cello-solve": Xylene 3:1	Toluene	Methyl Isobutyl Ketone	"Cello-solve" Acetate: Toluene 1:1
Viscosity (G.H.)	Z3-Z5	X-Z	Z3-Z5	Z4-Z6	Y-Z2	Z1-Z4	Z5-Z7	Z2-Z4	W-Z	Z1-Z4
Color (Gardner Std '53)	5 max.	4 max.	5 max.	6 max.	5 max.	5 max.	5 max.	5 max.	5 max.	5 max.
Wt. per gal., 25°C	8.8	8.5	9.0	9.4	8.8	8.9	9.4	9.2	8.9	8.6

*% Non-Volatile ± 1.0%

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For more information circle No. 13—last page

Review Articles

A literature review was published in series form in the journal *Paint Manufacture*. This extensive survey covers phenolics, amino resins, glycidyl resins, miscellaneous thermosetting resins, vinyl containing fluorine, vinyl esters, acrylic polymers and derivatives, miscellaneous ester-soluble resins, vinyl ketones and ethers, polymerization studies, vinyl hydrocarbon polymers, alkyds, polyesters, ionic polymerization, graft copolymers, and stereo-specific polymerization. Hundreds of references and patents are cited, generally within the period 1958-1959.[1]

In *Industrial and Engineering Chemistry*, Burrell briefly surveys developments in protective coatings.[2] In the same area, Schofield discusses epoxy, urethane, polyester, water-thinner coatings, corrosion, and plant protection.[3]

The chemistry of the deterioration of synthetic polymers is subject of a paper by Grassie. Chemical processes involved in such phenomena as embrittlement, softening, cracking and discoloration are reviewed.[4]

Dintenfass discusses paint vehicles; his article covers the solubility, EDM, aniline points and dilution rates of solvent mixtures.[4a]

Review articles dealing with specific types of resins and coatings will be noted under these individual subjects in this review.

Alkyds

A series of articles in PAINT AND VARNISH PRODUCTION deals with the subject of recent trends in alkyds. First in the series is a review by Lanson, which describes developments in polybasic acids, polymers, alkyd emulsions, solventless coatings; the alkyds are said to show "amazing versatility" in organic coatings, both by themselves and in conjunction with a variety of other reactants and polymeric materials. Second article in the series deals with the effect of chemical constitution on the properties of alkyd resins. This points out that alkyds are among the most complicated and least known of the polyester family; discusses some theoretical concepts. Formo and Smallwood then discuss water-thinner resins, their properties and advantages, with particular reference to several Arolon products (Archer-Daniels-Midland). The fourth article (Butler) is a general statement of the economic situation and potential for alkyds. Fifth of the series, an article by Mika, discusses epoxy-alkyd modifications; this is an extension of the work of Sommerville and Herr (*Industrial and Engineering Chemistry*, 49, 1957, 1078), with special emphasis on the study of the mechanical and chemical properties of the free films prepared from epoxy resin modified alkyd resins. Unsupported films from these systems, 1.5-3 mils thick, were examined for stress-strain properties, using Instron tester; the advantages of the modified systems—greater hardness, better chemical resistance,—are cited. Sixth article in the series (Eiszner, Taylor and Bolton) deals with trimellitic anhydride. This new alkyd raw material is prepared by Amoco Chemicals, for use in alkyd resin formulation. It is said to have possible uses in polyesters, dyes, plasticizers, epoxy curing, and as chemical intermediate. The final paper is by Long; this discusses research problems that lie ahead in the use of alkyds.[5]

Roberts and Kraft deal with the subject of alkyds in industrial finishes; theirs is a general article, covering application of alkyds, and advantages in their use. Eleven formulations for various purposes are cited.[5a]

Bullitt and Rudram devote a paper to a discussion of polymer structure and film formation. Oil-modified alkyds, hydrocarbon modified oils and alkyd resins, the mechanism of film breakdown, hardening by evaporation of solvent, factors controlling adhesion of paint films, organo-metallic systems, and chemical type coatings are reviewed.[6]

The relation between degree of esterification and the properties of alkyd resins is subject of a paper by Berryman. The theory of alkyd resin formation is considered in detail, and from this study is drawn the conclusion that alkyd resin formation is a stepwise esterification reaction, and that polymer properties will change predictably with the degree of reaction for a particular intermediate polyol blend. These changes are a function of the progressive condensation of mixed polyol half-esters, the nature of which can be determined by an expression for the average functionality of the mixture prior to reactions involving the loss of reaction water.[7]

An article by Benner and others deals with the modification of alkyd resins with methyl methacrylate and with acrylonitrile and styrene. Oil modified resins with a 50% oil length and a DCO:soya ratio of 50:50 were successfully modified with methyl methacrylate, using di-*tert*-butyl peroxide as preferred initiator. Most attempts to modify alkyds with acrylonitrile or a mixture of styrene and acrylonitrile resulted in premature gelation or formation of polyacrylonitrile, insoluble in the alkyd; however, two alkyds were successfully modified at level of 50% with mixtures of styrene and acrylonitrile in a 3:1 ratio or better.[8]

The methodics of the estimation of adipic acid in alkyds modified with drying fatty oils is subject of a paper by Grimmer. In the work he discusses, ASTM, Dutch Standarts and Kerchow's techniques were tried; the last gave best results. ASTM and Dutch Standarts gave deviations due to higher solubility of potassium adipate in washing liquid, and to adsorption of potassium soaps of fatty acids on the finely precipitated potassium adipate.[9]

Kraft discusses the alkyd composition graph and its applications; this is described as a solution of the problem of formulation of alkyd resins for a particular coating application, with specific requirements of performance, viscosity, and solvent, based on the theory that in a reaction between the diacid and polyol, the desired fundamental structure of an alkyd resin is based on the linear polyester sufficiently modified with a monobasic acid to prevent gelation. This concept is reduced to a graph, described in detail, which not only shows the limits of an alkyd formulation for a specific application, but demonstrates new approaches to improvement of quality. Alkyds from diacids, polyols, and monobasic acids are graphed.[10]

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The *Journal of the Oil and Colour Chemists Association* carries a paper dealing with sulphide staining of alkyd paints. It is pointed out that stains that appear mainly on flat alkyd paint films are due to lead sulphide, formed by reaction between small amounts of hydrogen sulphide in the atmosphere and the lead present in some paints. Best cure for the staining is to redecorate with lead-free paints; staining can be avoided by eliminating lead compounds from paint formulations.[11]

Seavell writes about low temperature phase separation of alkyds. He describes an analytical method for study of oil modified alkyd resins by segregation from suitable solvent at progressively lower temperatures. Three alkyds were investigated. Evidence indicates that low-temperature phase separation of alkyd resin from acetone solution is primarily a function of molecular complexity.[12]

Discussing isophthalic alkyds in architectural finishes, Stanton, Roholt and Wiff express their conclusion that drying of isophthalic acid alkyds is superior to that of phthalic alkyds of the same length. Best results are obtained with linseed oil or linseed-soya blend. Formulations are cited.[13]

Patents

A patent issued to Walus is devoted to alkyd-nitrocellulose coating. This is a liquid coating composition comprising pigment, volatile organic solvent, and organic film-forming material consisting essentially of a butyl methacrylate-alkyd resin copolymer and lacquer-grade nitrocellulose.[14]

A vinyl toluene-alkyd coating is patented by de Groot, Jr., and Hofferth. This is a paint composition comprising filler, pigment, solvent, and a vehicle comprising about 90-70% by weight vinyl toluene-siccative oil copolymer, and about 10-30% by weight non-drying alkyd resin.[15]

United States patent 2,859,188 covers an oil modified alkyd, a coating composition comprising an organic solution of 50-90% by weight of an oil-modified alkyd resin, and 10-50% of an etherified hexahydrobenzoguanamine-aldehyde resin.[16]

A patent granted to Wright, McGuire and Westfall covers a process for making a thixotropic coating product which comprises dispersing a polyamide, an alkylene polyamine, and a long chain monomer fatty acid, in a paint vehicle selected from the group consisting of alkyd resins, drying oils and resin acid esters at a temperature below the softening point of the polyamide.[17]

A coating vehicle is subject of a patent issued to Dean and Schefbauer; this is characterized by rapid dry and good color retention.[18]

In a process patented by Olson, alkyd resins are modified with alkoxysubstituted polysiloxane by interchange esterification.[19]

Schmutzler patented a coating composition comprising a glyceride oil modified alkyd resin, a reactive pigment, and a trialkyl ester of a phosphorus-containing acid.[20]

Oil-modified alkyds and esterified epoxide resins said to possess drying characteristics were patented by Carmody.[21]

A patent issued to Crouch deals with liquid polydiene coatings modified with oil-modified alkyd resins; the resulting flexible coatings (for metals) are said to show good wedge bend characteristics.[21a]

Bavley, Knuth and Thomas patented alkyd resins from hexahydrokojic acid.[21b]

United States patent 2,889,293 covers oil-modified alkyd-resin mixtures; an oil-in-water emulsion of a glyceride oil-modified alkyd resin, prepared in the usual manner, and the adduct—prepared by reacting an alkylene oxide of 2-4 C atoms with a polyhydric alcohol having at least 5 C atoms and 4 OH groups—are dispersed in an aqueous medium. The dispersion is then made alkaline. The pigmented emulsions give good enamel coatings. Patent 2,889,294 (Layman) covers the emulsifiers in the patent just discussed as separate compositions.[21c]

Glycerol alkyds of multiple use are the subject of a patent issued to Canning and Harris.[21d]

Cellulosics

The cross-linking of cellulose acetate butyrate with butylated urea formaldehyde resins is discussed by Salo and Kaul. Used as a modifier in cellulose acetate butyrate lacquers, butylated urea for-

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Coating for aluminum siding lasts ten years!

One coat of Sherwin-Williams' "Superclad" vinyl siding enamel, applied more than ten years ago to the aluminum house sidings of this dwelling, is still in fine condition. The coating deters the harmful effects of an industrial atmosphere, weathering, impact and abrasion. Exterior coatings based on BAKELITE Brand Vinyl Resins have top-flight color retention and exhibit no sign of checking, cracking or chipping.

Latex coating dries in two hours!

A vinyl acetate latex paint based on BAKELITE WC-130 latex is "China-Tone." Manufactured by A. C. Horn, Division of Sun Chemical Company, it was brush-applied with great success to the walls and ceiling of the Barbizon Room of New York's fashionable Barbizon Plaza Hotel. BAKELITE WC-130-based latices dry to the touch in just 30 minutes and are completely dry in two hours. They are relatively odorless and do not reveal brush marks, and are scrubbable within 24 hours after application.

Product coating is durable, resists moisture, impact and abrasion!

Vinyl dispersion resins are extremely popular in the field of product finishes. "Texkote" plastisol, formulated by Bradley & Vrooman Co., appears on the case of this portable home movie screen. It is colored blue and has a leather grain effect, called California Morocco. Vinyl dispersion coatings based on BAKELITE Brand Vinyl Resins have excellent adhesion, flexibility and tensile strength, and can be formulated in a host of attractive colors.

New Systems—

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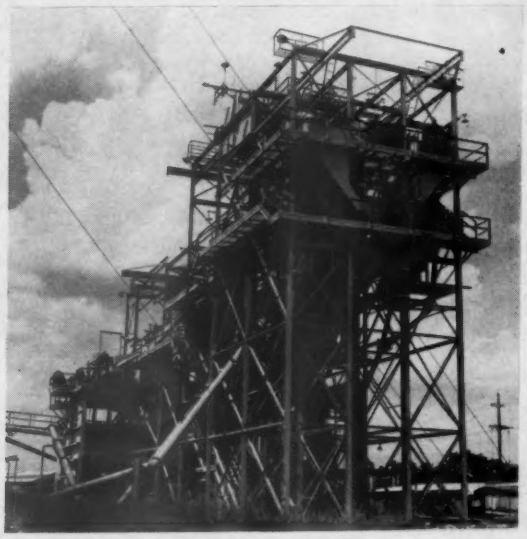
For more information circle No. 16—last page

IN PHENOLICS



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For more than four years, a "Duralite" finish, containing BAKELITE phenolic resin and formulated by Dixie Paint and Varnish Company for the Kirkland Paint & Supply Corporation, has protected this steel washing plant at the Virginia-Carolina Chemical Corporation against corrosion resulting from the great amounts of water that are used to wash the phosphate from the ore. In addition to phenolics for maintenance coatings, Union Carbide Plastics Company also has information on phenolic-based cold-mix varnishes and aluminum pigmented phenolic coatings—typical of the new techniques from which you can profit in Project Salespower.

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maldehyde resin causes appreciable insolubilization of the resultant coating. Evidence obtained in the experiments described here indicates that cellulose acetate butyrate insolubilizes because of a cross linking reaction between the resin and the hydroxyl groups of the cellulose ester.[22]

The January, 1959, issue of *Official Digest* carries a panel discussion of new formulating approaches in cellulosic finishes. Peterson deals with cellulose-gel lacquers; Teiser considers epoxy resin modified nitrocellulose lacquers; Ball writes about cellulose acetate butyrate; and Hirt reviews nitrocellulose furniture lacquers modified with catalyzed amine resins.[22a]

A United States patent issued to Baudecroux covers cellulosic varnishes and paints.[23]

Epoxies

An article in *Chemical Engineering* cites a study (by students at the Harvard Business School), of market trends in epoxies. Past production and consumption, present directions, and projected future of market totals are described. For 1963, a sales figure of 90,000,000 pounds is predicted (48,400,000 pounds of this for coatings), compared with an estimated 37, 400,000 pounds in 1959 (25,800,000 for coatings).[24]

The use of liquid epoxy resins in coatings is reviewed by Richardson. His paper deals with Union Carbide products—100% reactive, amber colored liquids which can be cured to a solid, thermoset state by addition of a catalyst or hardener, and are said to have a wide range of applications, indoors and out, for repair, for construction, etc.[25]

The types and uses of coatings based on epoxide resins are discussed by Leonard.[26] Mika considers the free-film properties of such coating systems. In the latter paper, use of an Instron tester for the measurement of stress-strain characteristics of several coatings (air drying esters, phenol and urea-formaldehyde resin-cured compositions, and aliphatic polyamine-cured compositions in unsupported films, 1 and 10 mils thick), is discussed. Tensile and elongation properties of these systems varied as functions of curing agent structure, cure cycle, and accelerated or natural weathering; however, at optimum cure of amine or PF or UF resin cured compounds, and among esters of comparable fatty content, the differences were insignificant during film formation, and leveled off as the cure reached completion when measured by disappearance of epoxide or alternative functional groups. Alkyd resin esters based on drying oil fatty acids were found to have one-third the tensile strength of epoxy resin esters of the same fatty acid content (40-60%), and to lose strength more rapidly on accelerated weathering than the epoxy resin esters. Mika also discusses yield values and pigmentation; pigmentation of the epoxy resin esters significantly retarded embrittlement during accelerated weathering.[27]

Kovacs writes of comparative tests made on styrenated and methyl methacrylate epoxy ethers. An epoxy resin-DCO ether, treated with 15, 30 and 45% respectively of styrene and methyl methacrylate, was made into a baking enamel (using melamine-formaldehyde resin as cross-linking agent), sprayed on panels and tested for hardness, adhesion, flexibility, gloss, flow, resistance to chemicals, moisture and ultraviolet light. Resistance to moisture, alkali and ultraviolet light was improved by monomer treatment; methacrylation was found superior to styrenation with regard to light stability. On the other hand, styrenation was slightly better in respect to moisture and alkali resistance. Flexibility decreased in all monomerized enamels; but 30% levels are not too brittle for practical applications.[28]

Patents

A patent issued to Dannenberg describes a method of minimizing crater formation in polyepoxide coatings; at the interface between coating and base material, a thin layer of a linear polymer is provided.[29]

Esterification of epoxy resins for varnish manufacture is subject of a patent issued to Stoesser, Sommerfield and Surine. Such esterification, carried out in the presence of trace amounts of organic chelating agents, forms resins which can be carried to an acid number of less than 1 without premature gelling or darkening.[30]

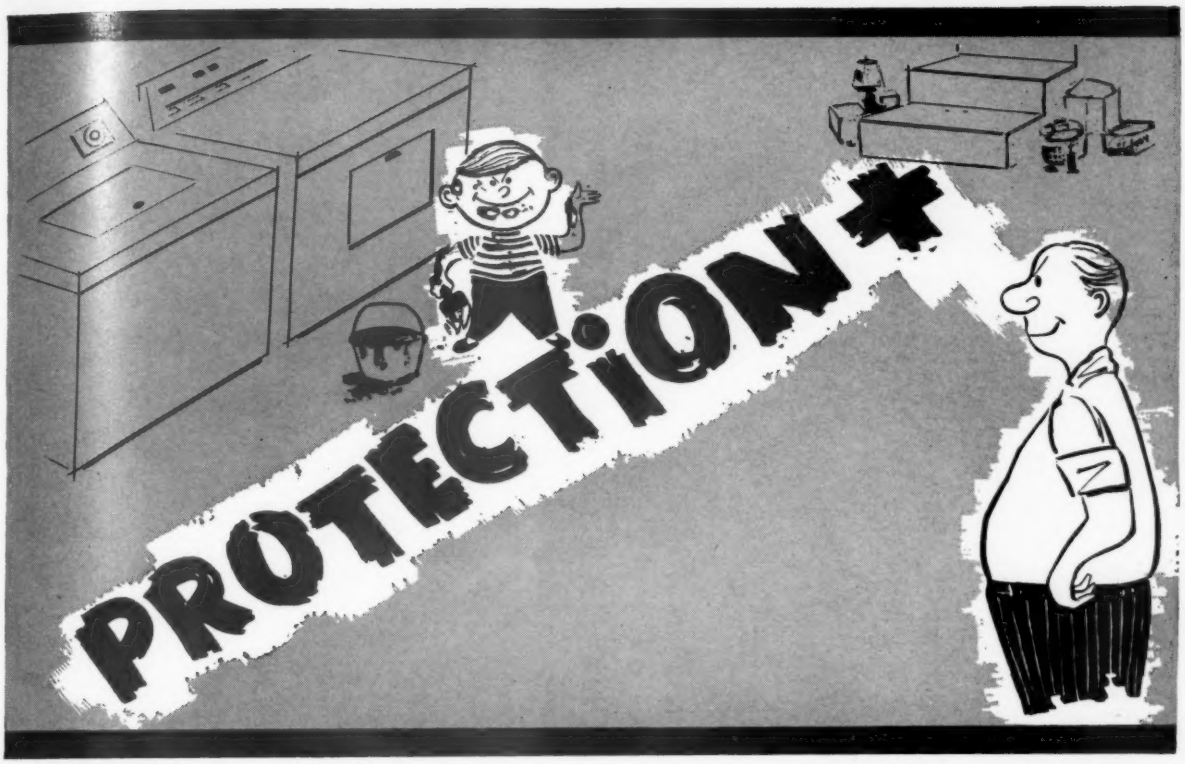
United States patent 2,870,117 describes a heat hardenable resinous composition comprising a polyglycidyl ether of a polyhydric compound and an interpolymer of an acrylamide with at least one other monomer having a $CH_2<C$ group.[31]

A patent to Fitzgerald and Benderly covers thermosetting resinous coatings. In their process, an epoxide resin containing curing agents which influence viscosity is used as a dip-coating composition to provide uniform coverage on irregular articles. Hydroxyamide derivatives of a fatty acid (e.g., *N*-hydroxyethyl-12-hydroxystearamide) cause solidification of the resin system at a temperature high enough to permit thermal curing without flow or slumping.[31a]

Two patents were issued to Yusem. The first of these dealt with alkyd resins containing epoxide groups; a short oil alkyd resin is treated with epichlorohydrin and sodium aluminate to form an epoxidized alkyd resin containing 1,6- 2,6-epoxy groups/mol. The epoxidized alkyd resin is combined with a monomeric compound containing terminal ethylenic unsaturation—styrene, diallyl phthalate, or diallyl cyanamide, and the mixture is cured with epoxy curing catalysts and peroxide catalysts to form the resins described. These resins are useful in the preparation of paints, laminates, etc.[31b] The second patent granted to Yusem is concerned with aqueous emulsions of epoxidized alkyd resins; an aqueous emulsion of the resin described in the previous patent is said to be useful as a coating composition for textiles, and, in mixtures with melamine-formaldehyde resins, as heat hardenable coating for metals.[31c]

Phenolics

Electric insulating varnishes—phenolic resin varnishes made from oil-soluble phenolic resin, tall oil, linseed oil, and alkyd resin—are discussed by Sing and others. Properties were determined. Best results were obtained with 5 parts drying oil (tall oil 85 and linseed oil 15%), and 4 parts oil-soluble phenolic resin at a baking temperature of 160°C. for 1 hour.[32]



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Patents

Allied Chemical Co. patented *p*-α-cumylphenol-*p*-substituted phenol-formaldehyde resin for coatings.[33]

Christenson and Cummings patented oil soluble butenylphenol formaldehyde resins, light colored varnish compositions consisting essentially of the product obtained by heating together a drying oil and the resinous condensation product of formaldehyde and a mixture of butenylphenols containing about 55-85% by weight of ortho- and para-monobutenylphenols, and about 15-45% by weight of di- and tributenylphenols.[34]

A patent issued to Straka and Weltman covers a phenolic resin varnish, produced from a phenol and formaldehyde in a two-stage reaction.[35]

Aelony was granted a patent covering esters of phenyl-phenol-formaldehyde resins, described as useful in primer compositions for metals.[35a] Somerville and Howard obtained a patent on coating compositions containing polyhydroxy ethers of phenol-aldehyde resins and poly (hydroxymethyl) phenol ethers.[35b]

Polyamides

In a French source, Poisson describes experiments covering a new class of polyamide derived from higher polyenic acids extracted from natural (or vegetable) drying oils. Reaction of the complex amide of lithium-aluminate on these esters produces primary polyenic amides which were reduced to amines and condensed also with the corresponding acids. In addition, from several polyamines, the diamines of linoleic and eleastaric acid were prepared; these compounds are polymerizable either by heating or autoxidation, yielding film-formers of tridimensional structure.[35c]

A patent granted to Förster covers mixtures of epoxy resins with polyamide-like condensation products, useful for coatings; the polyamide resins act as bonding agent in the compositions.[35d]

Polyesters

The effect of molecular constitution of polyesters on steam resistance of polyester-styrene copolymers was investigated by Bell and Bobalek. Polyesters were synthesized using varying proportions and types of dibasic acids, glycols, and some of these were modified with aromatic diisocyanates. Changing types of ethylenic or aromatic acids, or aliphatic polyols, or isocyanate modification affects hydrolysis resistance only slightly. However, when aliphatic glycols are replaced in part with partially aromatic diols, hydrolysis rate is retarded sufficiently to permit autoclaving for more than 24 hours at 250°F. steam.[36]

In *Paint Manufacture*, Daggett summarizes a course on acid catalyzed wood finishes, given at the Technical College for the Furnishing Trades, Shoreditch, England. The changes in method of application of finishes to wood, following the recent use of polyesters in such formulations, are considered.[37]

Patents

Farbenfabriken Bayer patented polyester coating resins, useful in air-drying lacquers.[38]

A patent granted to Graham and Parker covers polymeric coating compounds; these are curable compounds containing blended mixtures of a diisocyanate-modified polyester, poly (vinylidene chloride), filler, and aromatic diisocyanate; useful as flooring compositions.[38a] Rohm & Haas Co. patented polyester and amine-modified polyester coating compounds.[38b]

Polyurethanes

A panel discussion of urethane coatings was published in the January, 1959, issue of *Official*

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Digest. Covered are isocyanate reactive coatings (M. E. Bailey): chemistry, diisocyanate-castor oil, and diisocyanate-polyester coatings are reviewed; and improved epoxy performance (R. G. Ferguson).[39]

A good review article, covering the properties and applications of polyurethane finishes appeared in *Paint Journal.*[39a] A paper by Patton deals with the chemistry of urethane coatings, the types of vehicles, reaction conditions, one- and two-package systems, substrate preparation, solvents, and additives employed. Several formulations are cited.[39b]

Properties and applications of urethane coatings are subject of an extensive review article by Wells. Formulations are included.[40]

Gudgeon and Reynolds deal with certain aspects of polyurethane chemistry. Reactions of isocyanates, applications of polyurethanes (for fibers, elastomers, flexible and rigid foams), chemical reactivity, processing, and effect of structure on properties are all covered.[41]

Protective coating measurements for urethane coatings are covered in *Farbe und Lack*; this notes that Desmodur L (2,6-tolylene diisocyanate) has been found harmless as compared to Desmodur T.[41a]

Practical one-package urethane coating compositions are discussed by Remington and Athey. The system is a complete unit, requiring no catalyst or hardener; it is said to have excellent can stability in the absence of moisture. It is prepared by reacting toluene diisocyanate with selected polyoxypropylene glycols and a triol cross-linking agent. Hardness and flexibility of the resultant coatings depend upon the gram molecular weight of the polymer per cross-linking site. The system is particularly well-suited to use as floor varnish for severe service. Further uses are for exterior application over wood and for coatings on fabrics and rubber.[42]

Patents

A patent to Parker covers binders for surface-covering materials from diisocyanate-modified unsaturated polyesters and vinyl chloride polymers.[42a] A patent to Doggett and Johnson deals with paint coating reaction products of hydrocarbon isocyanates with ethyleneimine.[42b] Eitel and others patented high-luster, smooth coatings from soft resins from polyisocyanates and compounds containing hydroxy groups; the coatings contain 0.1-3% (based on resin) of a titanium or zirconium soap; they are chemically resistant, adherent, and have improved smoothness and absence of "craters."[42c] McPherson patented a stable polyurethane coating; this is a reaction product of a resin containing free OH groups and an unsaturated urethane isocyanate in a nonreactive solvent.[42d]

Silicones

In an article dealing with organosilanes and surface coatings, Mort discusses the partially ionic character of the carbon-silica bond in relation to chemical reactivity and thermal stability. Applications of organosilanes, for bonding surface coatings to glass and other substrates, and modification of pigments are discussed. Means of improving heat, light, electrical and water resistance of alkyds, epoxy and phenolic resins by reaction with the silanes are considered.[43]

An article by Andrianov comprises a comprehensive review of the subject of element-organic polymer compounds. Citing 320 references, the article covers polyorganosiloxanes, organosiloxanocar-

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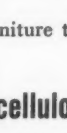

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bonic polymers, polyalkylsiloxanamides, polyalkylthianates, polyorganometallosiloxanes.[44] In another journal, the same author discusses silico-organic resins and varnishes and their applications.[45]

A paper by Goddard and Mason points out that the desirable qualities of silicones (heat resistance, resistance to weathering and chemicals) can be imparted to paints into which the silicones are incorporated. Selection of suitable resin, pigment and drier for particular purposes are reviewed.[46]

Patents

Sesso patented silicone coating compositions.[47] Organosilicon copolymers for use in coating compositions are subject of a patent granted to Midland Silicones, Ltd.[48] United States patent 2,860,074 covers a vinyl-acrylic silicone, comprising essentially 10-55% by weight of a film-forming vinyl resin, 40-85% by weight of an alkyl ester of an organic acid, and 5-50% by weight of an alkyl-aryl polysiloxane.[49]

Hedlund patented coating compositions containing organosiloxanes for "hammer" finishes.[50]

United States patent 2,881,146 deals with an organopolysiloxane emulsion.[50a]

Vinyls

An article by Fryman on vinyl dispersion for product finishes reviews formulation and applications of plastisols and organosols, including vinyl wrinkle finishes and polyvinyl acetate emulsion hammertone finishes.[51]

Hrivik, Lazar and Kovac write on the polymerization of vinylidene chloride. The purpose of their work was to investigate the effect of several solvents on the rate of heterogeneous polymerization of vinylidene chloride, and to determine the dependence of total polymerization rate upon monomer concentration.[52]

Patents

Magne, Skau and Feuge patented a vinyl chloride-vinyl acetate copolymer predominating in polymerized vinyl chloride.[53] A polyvinyl resin composition is subject of a patent issued to Greenspan and Gall.[54] Stabilized vinyl chloride resin (diphenyl mono-2-ethyl hexyl phosphite was stabilizer) was patented by Hansen and Zaremsky.[55]

A plasticized polyvinyl chloride, a resinous composition comprising polyvinyl chloride plasticized with an addition product of turpentine and a dicarboxylate, is covered in United States patent 2,867,598.[56]

Vogel and Bittle patented a vinyl coating, a heat hardenable resinous composition comprising a polymer of a vinyl halide and an interpolymer of an acrylamide.[57]

An American patent deals with a vinylated fatty acid ester containing compositions for metals, intended to serve as linings for metal containers, and prepared by copolymerizing an aliphatic vinyl compound, an epoxy resin, and an unsaturated carboxylic acid.[58]

A coating composition containing wax and ethylene-vinyl acetate copolymers was patented by Reding.[59]

Baggett and McClure patented a solvent for poly (vinylidene-chloride); the solvent is *N*-methyl-3-pyrrolidinone or 1,5-dimethyl-2-pyrrolidinone for a copolymer consisting of poly (vinylidene chloride) and copolymers of ≧ 85% vinylidene chloride with ≦ 15% monoethylenic vinyl esters. The polymer solutions may be used as lacquers.[59a]

Miscellaneous Resins

A paper by Long is devoted

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EVE	Low Cost Gloss Vehicle	70%	U - V
COFAR	Copolymer latex	55%	15 - 20 poises
FAFL	Flat alkyd vehicle	30%	V - Y
FAFL OD	Odorless flat alkyd vehicle	30%	V - Y
FAX	Low cost flat liquid	30%	X - Z
FAMO	Medium Oil Iso alkyd	50%	V - W
FALO	Long Oil Iso alkyd	60%	S - U
F 12L	Quick Drying modified phenolic	50%	E - G
FEGO	Vehicle for master painters enamel	60%	I - J
FV 726	Vehicle for wrinkle finishes	60%	T - U
FV 792	" " " "	60%	M - O
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to predetermined designs of resins. Purpose of this study is to show that ultraviolet light (290mμ to 390mμ) absorption, as well as adhesion, can be related by mathematical formulas to the chemical composition of a series of alkyd resins, a series of vinyl chloride-vinyl acetate copolymers, and a series of acrylic polymers. Alkyds based on *tris* (hydroxymethyl) aminomethane were prepared, in which the oxazoline ring formation was varied in an attempt to derive a mathematical formula for resin formation in which the two types of different reaction occur simultaneously. The author proposes that about 5,000 compounds be selected from the data available in Beilstein's *Handbuch* on the basis of the possibility of at least two simultaneous reactions, that these compounds be catalogued, and their reaction characteristics be expressed in mathematical terms relating composition to such physical properties as ultraviolet absorption. After this, the information would be fed to a digital computer capable to calculating a value of these properties for all possible reactions. The resultant information might be used as a basis for laboratory experiments to synthesize resins on the basis of "predetermined" design. Admittedly, much of this is visionary.[60]

Kolesnikov and Klimentova write about carbochain polymers and copolymers. Catalyst and activating agent were added to the solution of monomers in toluene, heated to desired temperature; alcohol and water were then added under stirring. Solvent and nonreacted monomers evaporate, the catalyst partially decomposes, and part of it is driven off. Filtered-off copolymer is washed with hot water and dried. Various factors—such as increase of reaction time, ratio of initial reactants, activator concentration, reaction temperature—are discussed.[61]

In a detailed technical review of the polymer chemistry of coating compositions, Hundert cites the advantages of copolymers over external plasticizers. An interesting table in his article lists the effects of several second monomers on various polymers. The properties of copolymers are mentioned, the theory of copolymerization is summarized, and there is a detailed account of monomer reactivity ratios.[62]

Polymers containing fluorine are the subject of a paper by Banks and Haszeldine. Reviewed in their article are polytetrafluoroethylene (Teflon, Fluon), polychlorotrifluoroethylene (Kel-F, Hostaflon), and the copolymer of hexafluoropropylene with vinylidene fluoride (Viton A). Properties and applications are cited.[63]

A Russian article dealing with new polymer synthesis with an inorganic molecule chain appeared (Andrianov, Zhdanov and Kazakova). Dodecaethyltitanoxytetrasiloxane and nonamethylalumoxytrisiloxane were prepared by decomposing sodium triethylsilanolate with titanium tetrachloride and sodium trimethylsilanolate with titanium tetrachloride and aluminum chloride. With other compounds, analogous polymers were formed. It was concluded that such elements as aluminum, titanium, phosphorus and other elements of the second, third, fourth and fifth groups of the periodical table can be synthesized into polymers, soluble in organic solvents, and forming films (on solvent evaporation) that are elastic.[64]

The formation of aluminum resins by hydrolysis of chelated aluminum alcoholates is subject of a paper by Kugler. The reaction intermediate of 1 mole each of aluminum-ethylate and acetoacetic ester is hydrolyzed at elevated temperatures. The amount of free ethanol and acetoacetic acid ester formed and water reacted indicate that only the aluminum-ethylate groups are hydrolyzed; the diluted acetoacetates are not. Resins formed contain Al-O-Al chains.[64a]

Another Russian source notes that "ethinol" paints have been used in the USSR shipping industry since 1956 because of their considerable water resistance, short drying time, possibility of application at temperatures to −25°C., and their high adhesive powers on steel surfaces. For example, "Slava-6" coatings offer full protection more than ten months after application in both tropical and arctic conditions. "Ethinol" paints are 1.5-2 times cheaper to use than oil paints.[65]

Childs and Coates devote a paper to organophosphorus polymers. The structure and properties of these compounds, and their applications in resin systems, are discussed. Phosphorus-containing polymers of polyene, polyester, epoxy, phenol formaldehyde and amide formaldehyde types, as well as basically new types of polymers, are reviewed.[66]

Heterogeneous chain polyamide studies are the subject of a Russian article by Frunze, Korshak and Koslov. Polyamides and polyamido-esters were synthesized by reaction of bisoxazolones with diamines, glycols and amino-alcohols, in a solvent medium, and at temperatures not exceeding 60°C. End products are solid powders, white, quite soluble in cresol, insoluble in chloroform and benzene.[67]

Parini and Berlin describe a new method for polyolefin synthesis. Benzidinedicarbonic-3,3′ acid is *bis*-diazotized and the *bis*diazo decomposition product decomposed; a soluble polymer results. The polyacid forms a hard film. Conversion may also be effected by di-(*N*-nitroso-*N*-acetyl)diamines.[68]

A paper by Ravenscroft deals with the use of polybutenes in caulking compounds. The properties of polybutenes, particularly as they affect the qualities of slump, oil retention and initial consistency or extrudability, are described. Formulations incorporating several Indopols are cited.[69]

The effect of structure of an alcohol on the film-forming properties of its complex esters is subject of an article by Edlinskii. With azeotropic esterification, complex esters were obtained. Xylene solutions of an oil and an alcohol were heated in the presence of zinc oxide or lead oxide. Results obtained in this reaction are discussed; it is concluded that space structure of the alcohol group in the ester is a determinant of rate of transformation into tridimensional polymers.[70]

Patents

Greenlee patented a resinous coating composition, containing one or more film-forming resins in solution in a common solvent or combination of solvents.[71]

Liquid coating compositions from polythiol polymers, metallic driers and amines are covered in a patent issued to Fisher.[72] United States patent 2,877,215 describes a coat-

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ing solution for steel, comprising phosphated copolymers of dioxolane esters.[73]

Shelly patented aminoplast resin coating compositions; these comprise a solution, in an organic solvent, of a long-oil alkyd resin, a butylated dimethylolurea, and the monosalt of maleic acid with triethylamine.[74]

United States patent 2,880,194 describes thermosetting coatings suitable as protective coatings, and comprising (a) an aliphatic diamine having an iodine number greater than 75 and the structural formula:

$$R—\underset{H}{N}—(CH_2)_x\,NH_2$$

in which R is an aliphatic hydrocarbon radical having 8-22 carbon atoms and x is an integer from 1-4, and (b) a glycidyl polyether of 2,2-*bis*(*p*-hydroxyphenyl)propane having an epoxy equivalent of 140-1000.[75]

Aqueous coating compositions consisting of coal acids, starch and plasticizers, and resistant to nonpolar organic solvents, are covered in an American patent.[76]

A coating composition of asphaltenes and plasticizer is subject of a patent issued to Pickell. This comprises from 25-50% be weight of asphaltenes and 75-50% by weight of soft asphaltic bituminous material, the compositions containing sufficient asphaltenes to render them non-honogeneous.[77]

Crouch patent a modified polydiene coating, useful in can manufacture.[78]

Curing films of butadiene-styrene copolymers were patented by Esso Research and Engineering Company. High-intensity ionizing radiation is used to produce hard, glossy films without discoloration.[79]

Subject of a patent granted to Guest, Hampton and Hurd are pigmented polymeric coatings, based on plasticized aqueous polymer dispersions.[80]

Fischer and Mika patented polymers from unsaturated aldehydes and polypentaerythritol.[81] United States patent 2,904,526 deals with a coating composition comprising at least 2% be weight of a zinc-ammonia polymer complex.[82]

Chloroethylene polymer ethers are covered in a patent issued to Gordon.[83]

Union Carbide Company patented opaque thermoplastic resin coating compounds; the resins, especially those pigmented with titanium dioxide, are made more opaque by addition of 0.1-3% aluminum pigment having a covering area on water of 7000-25000 sq. cm./g.[84]

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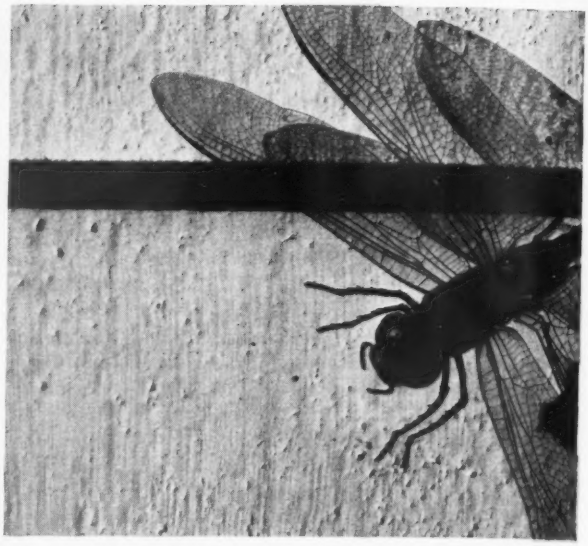

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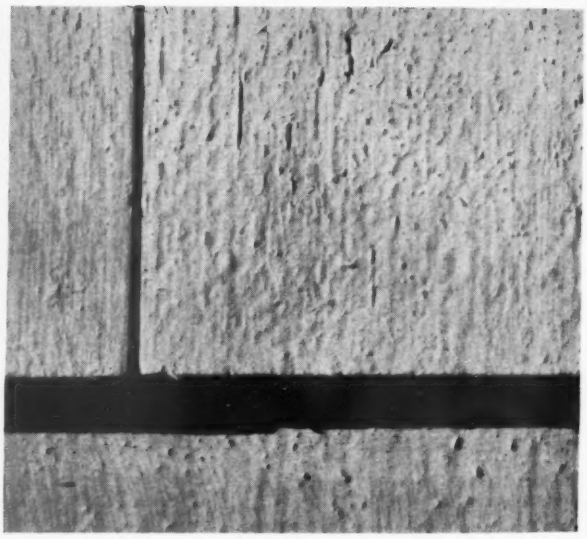
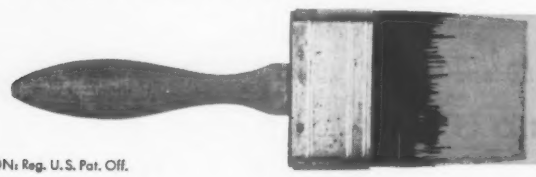


LATEX OVER EXTERIOR WOOD

New Latex paints for use on primed or previously painted wood exteriors are on the market and doing famously. They're being made by major manufacturers and these paints are based on Lytron 680. Share in this great new growing market. With Lytron 680, you need no major equipment or processing changes. And with this unique acrylic-type polymer, you can produce exterior latex paints that cut painting time in half, dry quickly, form smooth films down to 40°F. There's no color mottling or spotting. Adhesion is excellent, color retention superior. The small particle size of Lytron 680 assures good performance of high pigment concentration. Clean-up is with soap and water. Write today for data and samples. Monsanto Chemical Company, Plastics Division, Surface Coating Dept., Springfield 2, Mass.



Other Monsanto surface coating materials include Amino Resins, Phenolic Resins, and Styrene Latices and Resins.

Monsanto

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For more information circle No. 24—last page

LATEX EMULSIONS

LATEX paints for exterior wood application highlighted the emulsion field last year. Latex house paint systems are said to have excellent blister resistance and thus overcome one of the major problems of oil paints on wood. However, such paints do have some limitations in that thinner films are applied, and an oil based primer should be used, particularly on bare wood surfaces which show heavy chalk. Surface preparation must be somewhat more complete than with oil systems or early peeling may occur.

Unquestionably the matter of painting over chalking oil surfaces with latex paints is a crucial factor in the satisfactory performance of these paints in exterior applications. For best results latex suppliers have recommended several techniques. These include: (1) application of a polyvinyl acetate surface conditioner, or in some cases, these may be mixed directly with the emulsion topcoat; (2) application of an oil or alkyd primer for previously painted surfaces in poor condition; (3) on new wood, oil primers or latex primer containing lead acetate to sequester stains from the wood should be used; (4) addition of drying oils to the emulsion—such paints show excellent adhesion over heavily chalked surfaces when used as the first coat in repaint work.

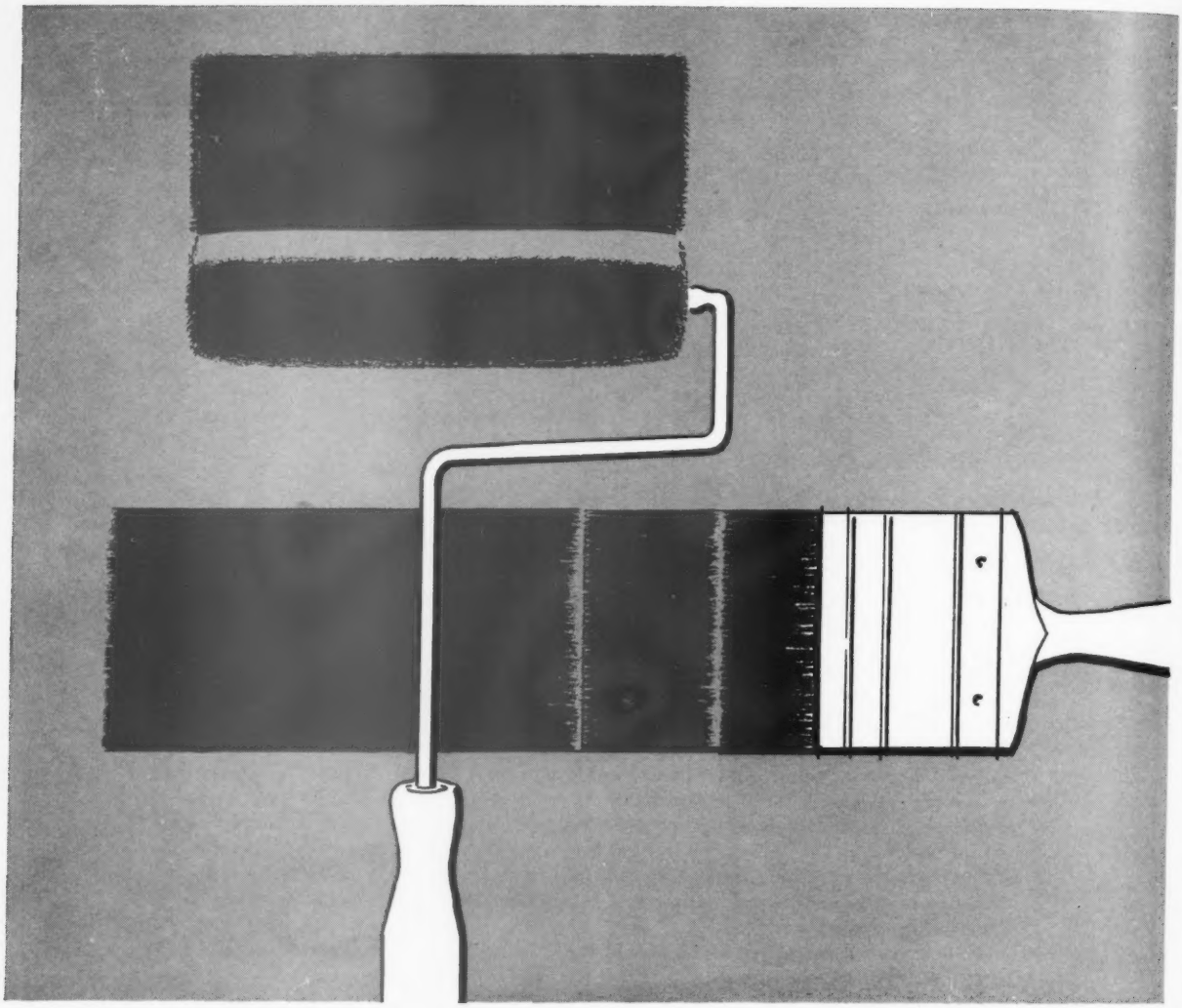
To achieve a full measure of success in the exterior field, most experts feel that a combination of primer and topcoat in one package is a must. Only in this way will water-based exteriors afford the same ease of application with respect to a number of coats and surface preparation as the oil-based types.

A further development of interest in exterior latex paints is a vinyl-acrylic resin that is compatible with both zinc oxide and leaded-zinc oxide pigments. It is expected that exterior formulations would benefit markedly from the many desirable properties imparted by zinc pigments, including good opacity to ultraviolet light, good cleaning and color retention properties and resistance to mildew.

In the industrial field there has been a growing trend toward the use of water dispersed system.

Among the developments in this field are: a polyvinyl acetate emulsion polymer for metal application which will cross-link with heat to a very high degree of solvent insolubility; thermosetting acrylic emulsion which show good hardness, impact resistance, adhesion, gloss, and resistance to water and chemicals.

Last year saw considerable activity in developing water-soluble systems. These included a water soluble melamine-acrylic resin; a specially-blocked isocyanate and an amine bearing resin in an aqueous solution; use of trimellitic anhydride in synthesizing water soluble resins; use of diphenolic acid in formulating a water-soluble resin for baking systems on metal; and a water soluble, chemically modified vegetable oil for industrial metal baking primers.



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Water-Thinned Coatings

A symposium on water-thinnable coatings which appeared in *Official Digest* for February, 1959, contained several papers dealing primarily with latex emulsions. Thus, Loebel described the determination of the average particle size of synthetic latices by turbidity measurements; Garrett, Prentiss and Scott discussed factors affecting the levelling of latex paints: their "detailed physical picture" describes the mechanism of levelling, and shows how this phenomenon is controlled by yield stress and wicking rate. Effect of thickener type, thickener concentration, pigment volume concentration and extender on flow and levelling were investigated; high order effects and interactions between variables studied were observed. The levelling phenomenon is expressed as a function of yield stress and wicking rate; the equation is cited. Gordon and Harmon report results of a radioactive tracer study of copolymerization vs. post plasticization of polyvinyl acetate emulsions; evidence from their initial series of exposures indicated that in the copolymer the plasticizing comonomer is completely bound into the polymer by valence bonding, that for the plasticizers tested, migration of plasticizer proceeds at a rapid rate, and that the exterior performance of the homopolymers will depend on the properties of the polymer itself. Liberti and Pierrehumbert write on the determination of critical pigment volume concentration of vinyl emulsion paint systems by pigment sorption method. A series of pigments and pigment combinations were evaluated for this determination by scrub test method, tensile strength, and elongation. Test data show that the theoretical CPVC derived by the water sorption value (calculated) approximates within 3% that obtained by titrations with a dispersant solution consisting of Tamol 731 and potassium tripolyphosphate. Scheufele and Tompkins devote a paper to formulation of water-thinnable paints from emulsifier-free vinyl acetate copolymer dispersions. Interior flat wall paints were made at PVC's of 50, 60, 70 and 80%, and were found superior to similar paints made from conventional emulsifier-containing copolymer dispersions in resistance to water spotting, resistance to wet pigment rub-off, and resistance to wet abrasion. Subject of the next paper is microbiological deterioration of water-thinnable coatings (Ross and Buckman). The factors of deterioration are considered; experimental studies show that the proteins employed as emulsion stabilizers are hydrolyzed to amino acids, and that it is the further degradation of these amino acids which results in spoilage characterized by putrefactive odors. Carbohydrates used as stabilizers are reduced to simple sugars by bacterial enzymes as indicated by chromatographic studies. Other results are reported. Final article in the symposium is by Fordyce, Dupre and Toy. This deals with alkali soluble acrylic emulsions. The general characteristics of these emulsions are considered and compared to the conventional acrylic water soluble salts. Solubilization of these emulsions is discussed, including the effect of degree of neutralization on pH and viscosity.[1]

An article by Talen and Hover covers film formation of latex coatings and their properties; electron micrographs are interpreted to confirm Brown's theory of the mechanism of film formation (cf. *Journal of Polymer Science*, 22, 1956, 423-434).[2]

Chemical and Engineering News cites the emergence of exterior latex paints recently; the market is estimated at 5,000,000 gallons a year. Introduction of several new formulations in 1960 is planned. Advantages of the exterior latex paints are these: better resistance to ultraviolet light, no blistering, quick drying, ease of application, longer endurance. Some deficiencies of application, particularly on exterior wood surfaces, are yet to be solved.[3]

Scheufele discusses the causes and effects of efflorescence and framing. This author concludes that these are related problems, but differ in nature and causes. Use of water-dispersed epoxy ester resin as paint additive appears to obviate the problems with conventional polyvinyl acetate emulsions; where true efflorescence or framing are widespread, Everflux MA and toluol or butyl Cellosolve acetate are used as vehicle and consolidating agent respectively.[4]

Patents

Berenschot, Pinhasik and Bierman patented freeze stabilization of polymeric coating compositions (using N - aliphatic - β - aminobutyrates).[5] Dibert and Taber patented stabilized latex coating compositions containing zinc oxide and alkali metal salts of monooctyl phosphates.[6,7] Aqueous colloidal dispersions are patented by Adams and Johnson.[8,9] The subject of United States patent 2,889,236 is aqueous latex-base exterior primer paint; linseed oil (raw or heat-bodied) is added to latex paint based on polymer of acrylonitrile, 2-ethylhexyl acrylate, and methatyrene, crylic acid.[10]

Acrylics

An article in *Verfkroniek* deals with acryl resin dispersion. The theory and mechanism of polymerization of emulsions are discussed; the manufacture of acrylic resin dispersions is dealt with in detail: properties of compounds are cited, applications noted.[11]

Patents

United States patent 2,865,877 (to Hatton, Stieber and Toothill) covers an aqueous coating composition comprising (1) 33-90 parts of a salt of a copolymer of at least one acid of the group consisting of acrylic, methacrylic, and itaconic acids with at least one ester of an acid of this group with an alcohol.[12], and (2) 5-45 parts of a copolymer.

A water paint containing butadiene-methyl methacrylate copolymers is patented by Balfe and Edgerley; the white paint is said to have good brush stability.[13]

Styrene-Butadiene

Loranger and others discuss the synthesis of uniform particle size styrene and styrene-butadiene latexes for paint formulation. Their article discusses two methods of producing uniform synthetic latexes by emulsion polymerization; one of these methods uses a conventional recipe in most respects except that the quantity of emulsifier is reduced markedly. The second method involves a multiple-step procedure known as the seeding process. The research de-

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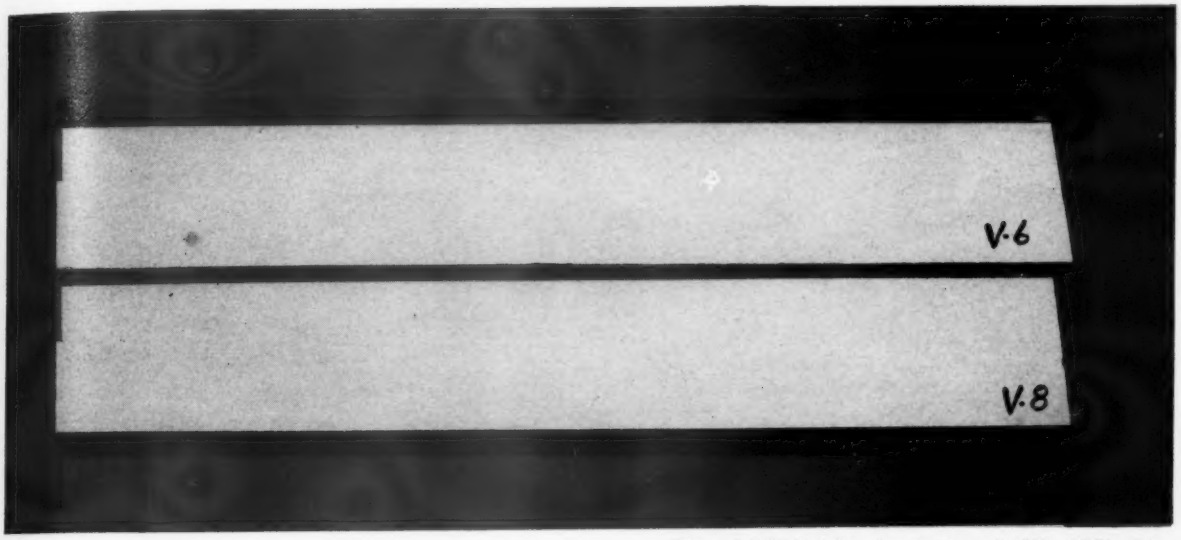


The panels highlighted above show the extreme durability of PVA paints.

7 years in all kinds of weather and these PVA paints based on "Elvacet" still are in excellent condition

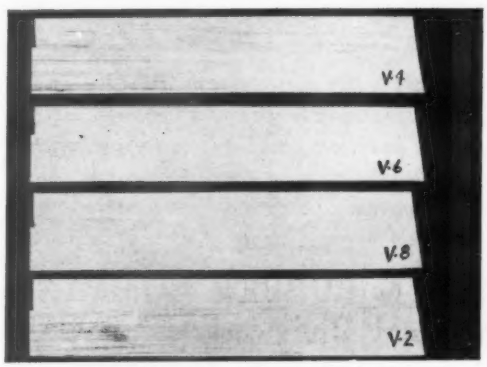
In January, 1953, these red cedar panels were painted with two coats of 27% PVC paint formulations based on "Elvacet" and were exposed in a south vertical position at Wilmington. They're still in good shape; clean and white, without chalk washdown or serious erosion. The original cedar rust disappeared within a few months. (To minimize cedar staining a solvent thinned primer should be used if the topcoat is a light shade.)

These panels (above) not only show the extreme durability of PVA paints based on "Elvacet", but also emphasize the need for *proper formulation.* They are concrete examples of the way Du Pont can help you formulate better PVA paints. In fact, these exposure panels are just part of the more than 12,000 panels Du Pont is testing. Du Pont's Electrochemicals Department started testing PVA paints in 1947 and is currently testing thousands of formulations based on "Elvacet" to help you make longer-lasting, better-looking and lower-cost PVA paints.

Look to Du Pont for the long-term exposure results and "know-how" you need to get into the profitable exterior latex paint market. Call your nearby Du Pont representative; he'll be glad to arrange for you to visit the Du Pont paint test farm and answer your questions on "Elvacet".

The photo at right shows the two panels above flanked by two other panels in the same series of exposures that show signs of erosion and need for repainting. The reason for this is improper formulation; an incorrect ratio of chalk-resistant rutile titanium dioxide to free-chalking anatase titanium oxide.

Although these panels have not performed as well as the other two, they did succeed in adding valuable information to Du Pont's vast storehouse of PVA knowledge . . . for your benefit. Be sure to get in touch with your nearest Du Pont representative for reliable information on exterior latex paints.



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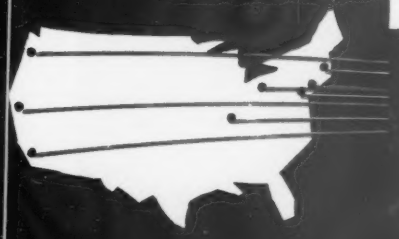

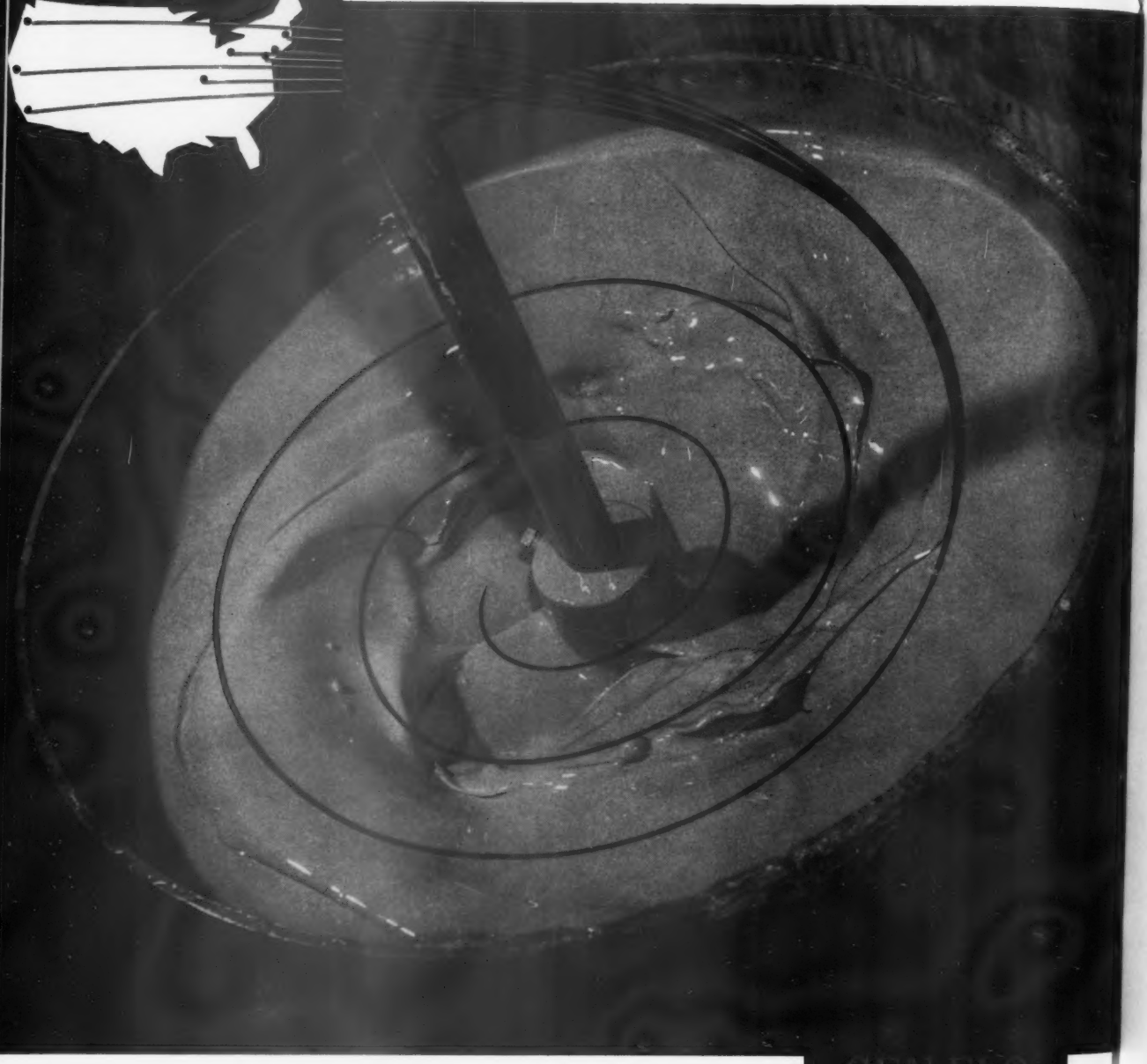

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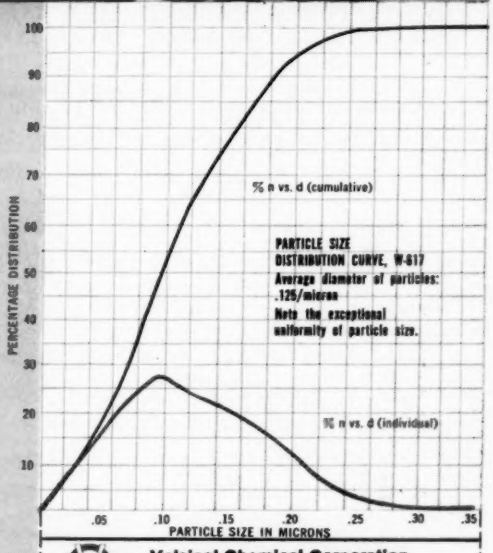

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← For more information circle No. 28—last page

scribed in this article reviewed these classical methods and developed some additional new techniques for synthesis of uniform latexes.[14]

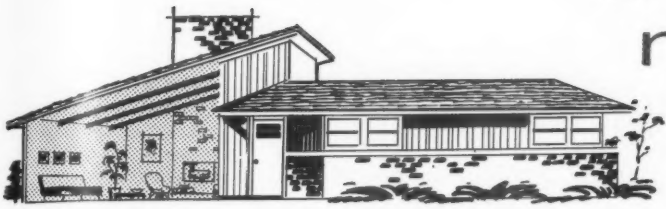
Patents

United States patent 2,856,300 covers an emulsified composition for latex paints.[15]

Vinyls

An article by Tompkins reviews developments in polyvinyl acetate coatings. Properties, uses, and application in interior and exterior paints are discussed.[16]

McCarthy and Evans devote a two-part article to vinyl copolymers—their development and future. First article deals with these paints in general, and the use of internally plasticized polyvinyl acetate copolymer emulsions. Second part of the series discusses vinyl coploymer emulsions in detail, and recounts some advantages they possess over post-plasticized homopolymer emulsions.[17]



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For more information circle No. 31—last page

DRYING OILS and DERIVATIVES

THE 1959 flaxseed crop was down sharply from that of 1958, according to U.S.D.A. farm crop estimates.

Two developments brought on this shortage. To begin with, support prices for the past crop were sharply reduced. This naturally caused a reduction of planted acreage. Despite this reduction in planting, the crop would have been more adequate had we had favorable growing conditions. However, the flaxseed crop turned out to be real disappointment because soil moisture shortages and extremely high temperatures during July and August took their toll in terms of yield reduction. Thus, throughout the harvest and early fall we witnessed a constantly advancing linseed oil market as flax prices continued to climb. However, despite the reduced crop and the resulting rising flaxseed market, United States flaxseed was competitive on a world trading basis throughout last fall. Thus with a short crop to begin with, and with U. S. flax competitive on a world basis, the net effect was a further reducing of available supplies. Throughout last August and September buyers closely observed these flax developments and anticipating a tight situation covered their linseed oil requirements well into the current year.

Viewing the current statistical picture on all stocks of flaxseed and linseed oil and balancing available supplies against anticipated demands, it appears that linseed oil will be rather "tight" in the months ahead.

Turning to soybean oil, it must be recognized that while the paint and varnish industry consumes but a small portion of the soybean oil produced, the total economics of the entire soybean oil and soybean meal industry determine price levels. With the demand for meal growing within recent years, the supply of oil far exceeded domestic demand. This situation has had a depressing effect on the price of soybean oil not previously seen since pre-World War II.

Consumption of tall oil reached some 600 million pounds in 1959. The decreasing supply of wood rosin and the abundance of soybean fatty acids has brought about a change of interest in tall oil during the past few months. With the consumption of rosin up 16% but production at best only 2% higher than 1958, rosin is due to be tight. Since gum and wood sources for rosin show no appreciable increase in production, considerable interest has developed in tall oil as a source for rosin to fill the gap.

With the price of soybean showing a downward trend, tall oil fatty acid producers experienced some difficulty to compete at present price levels. However, some tall oil suppliers feel that increased production of their material will mean a slight price reduction thus attracting larger usage of this oil in the ensuing years.

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General

The *Journal of the American Oil Chemists' Society* published a symposium on fifty years of fat and oil research in selected countries of of the world. Lovern reviewed some significant advances in Great Britain; Pacquot covered the subject for France; Kaufmann wrote of advances in Germany; Lemon discussed the last fifty years in Canada; Horn and Sutton assessed work in South Africa for the same period; Martinez Moreno wrote, in the symposium, of research carried out in Spain; Harwood covered fatty acid applications; Robinson and Mattil considered progress in the technology of edible fats and oils; Scofield wrote about the utilization of inedible fats and oils; and Bolley devoted a paper to progress in castor oil.[1]

Along the same lines, Hilditch describes recent advances in drying oil chemistry. He covers research on, and applications of linseed and tung oils, and discusses less familiar oils suggested as substitutes for these, as well as the chemical nature of the unsaturated acids present in these rarer oils.[2]

A detailed series dealing with drying oils is carried in the November, 1959, issue of *Journal of the American Oil Chemists' Society*. First paper is by Greenfield. This deals with tung oil, and covers preparation, properties and uses. Recent experimental work, including hydroxylation and irradiation, are briefly discussed. An interesting application is the use of the oil in PVA exterior paints. In a three-year exposure test, using a paint containing 15% tung oil based on vehicle solids, no visible signs of cracking, breaks or flaking were observed; similarly, a laboratory study showed an increase of adhesion in tung-polymer paints. Second paper in the series is by Gardner; this deals with driers for drying oils. An extensive review, it covers mechanism of drying, types of driers (including the metals lead, calcium, cobalt, manganese, zinc and iron), as well as calculation of drier dosages, driers for Epons, silicones, conjugated oils, styrenated alkyds, and other polymers. Rheineck writes about drying oils in varnishes; his extensive review is devoted to the "classical" varnish (one-coat drier, thinner, resin and oil), and deals also with oils used in varnishes, including much technical information as to their chemistry, properties and effects on varnish formulation. Recent technical developments are described. Rheineck points out that the decline in varnish production makes research in certain areas improbable. Fourth article in the series, by Kraft, is devoted to the subject of drying oils and acids in alkyds; this reviews the factors that determine use of a particular drying oil for a specific purpose, these factors including performance considerations, processing requirements, applications properties, and economic requirements. This paper is followed by one by Dunning, dealing with drying oils in printing inks. The author points out that the increase in printed materials has necessitated the development of fast drying inks; a concomitant development of new printing surfaces (polyethylene, cellophane, etc.) has similarly brought about new ink formulations. His extensive review covers binders, types of printing inks, oils used as inks, oil resin systems, oil-modified alkyds, and over-print varnishes. Sixth paper in the group, by Dunlap, deals with drying oils in floor coverings; the chemistry and uses of these oils are discussed in considerable technical detail. Miller, in the seventh paper, writes about degradation of drying oil films. The mechanism of degradation is discussed in detail; methods of measuring chemical changes—particularly oxidation—are described. Eighth paper is by Goebel; this considers chemical intermediates and derivatives from unsaturated oils and acids. Final paper is a discussion, by McHale, of the economics of drying oils: tall oil, flaxseed and linseed oils, soybeans and soybean oil, castor beans and oil, safflower, oiticica, tung, fish oils, etc., are reviewed from the point of view of production and consumption.[3]

A nine-part review covers various aspects of drying oil technology. Link describes general methods of analysis of the oils; he summarizes chemical methods (iodine, hydroxyl, saponification, acid, carbonyl, peroxide, and unsaponification values), physical methods (viscosity, color, specific gravity, refractive index), specific methods (foots test, break test, etc.), and instrumental methods (ultraviolet, infrared, gas chromatographic). Wingard describes extraction methods; Mattikow discusses refining methods. Fourth part of the discussion, by Tess, is devoted to synthetic drying oils and vehicles from unsaturated acids and synthetic polyols. This article discusses polyols of low functionality, resinous polyols, epoxy resins as polyhydric alcohols, techniques in the esterification of epoxy resins, and properties and applications of the resins. The following paper, by Stanton, is devoted to isocyanate-modified drying oils, and deals with their chemistry, formulation, variables and properties, particularly of urethane oils. Sixth part of the series (Privett) discusses autoxidation and autoxidative polymerization; the mechanisms are discussed in detail. Dutton describes research methods of analysis: fractionation, identification (ultraviolet and infrared and mass spectra, nuclear magnetic resonance spectroscopy). Eighth paper is by Bolley; this discusses production, composition, properties and uses of dehydrated castor oil, followed by a brief account of DCO fatty acids. Final article in the series is a discussion by Helmreich; this considers production and properties of copolymer oils and the chemistry of monomer modification.[4]

The relation between viscosity of polymerized drying oils and their temperature was studied by Shakhkeldyan; his article includes a nomograph.[5]

The chemistry and application of dimerized fatty acids are reviewed by Rowe.[5a]

An article in *Peintures, Pigments, Vernis* considers possible applications of abrasin oil (Indiachinawood oil).[5b]

Specific Oils

Bolley and Domingo write of recent advances in castor oil technology.[6]

Chemical Week carries a brief account of work done at the Northern Utilization Research and Development Division (Peoria) of the United States Department of Agriculture, on seed oil of Cape marigold (African daisy). The oil

contains dimorphecolic acid, which gives it qualities similar to those of castor oil. Economic feasability of extracting the oil has not yet been investigated, but since most of our castor oil is imported, the question may be of some importance.[7]

Aggerwal reviews the properties and possibilities of application of kamala seed oil; the oil, extracted with petroleum ether, is said to behave similarly to tung oil in the preparation of various coatings. The article surveys the technical literature covering applications of this oil.[8]

Beal and Bukke write of linoleic acid obtained from safflower oil by liquid extraction.[9] Purdy and others discuss safflower seed and some of its applications. Estimated production of the seed for 1959 was over 225,000,000 pounds in the United States (largely in California). Processing of the seed, its composition, properties, and some of its uses are reviewed.[10] Aslam cites interesting results in a study of safflower oils from Indian sources.[11]

A two-part article by Hassel and Lawrence discusses oiticica oil. In the first part, the economics and general properties of the oil are described; in the second part, the authors describe formulation and production techniques.[11a]

The market situation for United States soybean oil is the subject of a paper by Bunnell.[12]

A new tall oil derivative is described by Craft. This is NPT Concentrate (Newport Industries Co.), a new polyhydric alcoholic ester useful in interior latex type primer-sealers and flats, in exterior latex finishes, and to some extent in industrial coatings of the emulsion type.[12a]

Tobacco oil in the production of varnishes is the subject of a paper by Balbi. Use of the oil as a stand-oil, and in the manufacture of varnishes, alkyd resins and inks is discussed.[13]

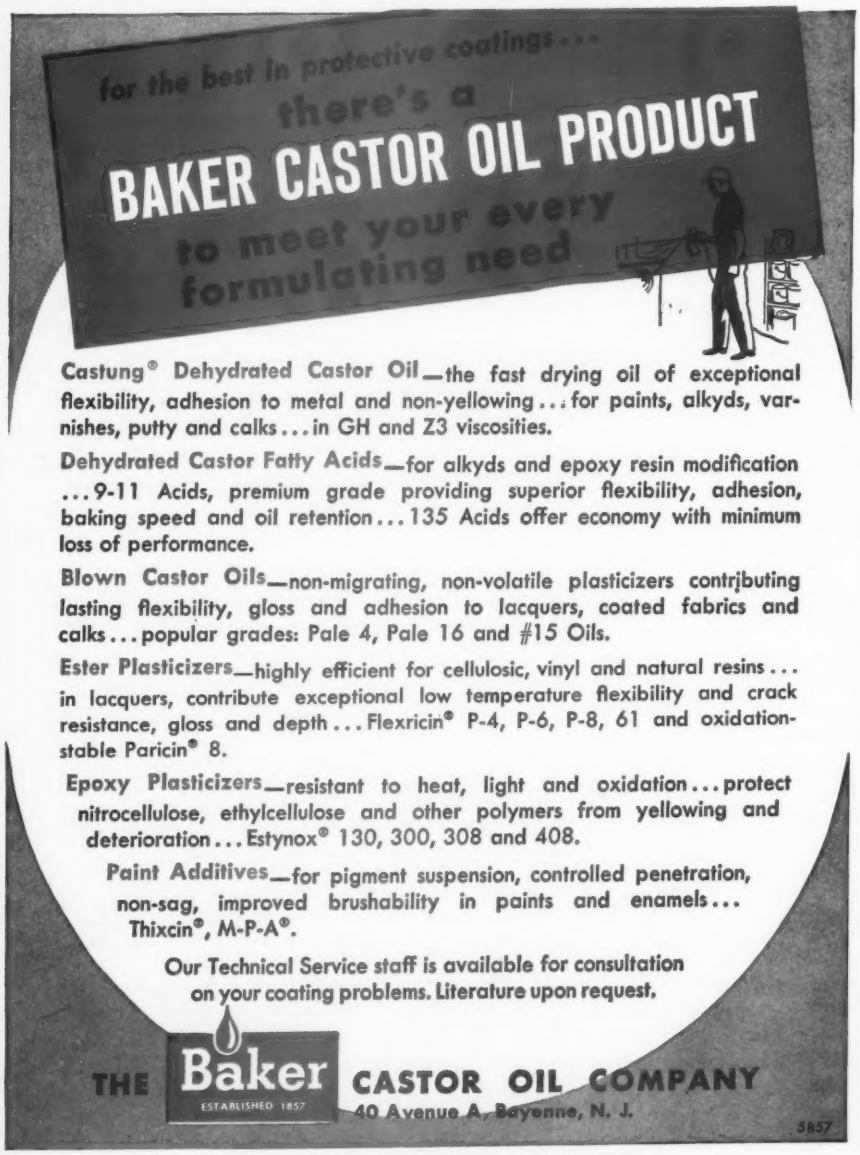
Radiation Studies

The *Official Digest* reports some effects of gamma radiation on vegetable oils. Soybean, linseed and tung oil were subjected to high dose of gamma rays from Cobalt 60. Bleaching, increase in viscosity, and changes in configuration of unsaturated groups in chemical structures were observed. With soya and linseed oils, the unsaturation tends to become conjugated; in addition, isomerization from *cis* to *trans* form occurs. Tung oil shows decrease in conjugated unsaturation, associated with polymerization to a benzene insoluble product. Color changes were noted. It is concluded that exposure required for all these changes is uneconomical and that value is thus low: similar effects can be obtained more cheaply with other techniques.[14]

Treated Oils

Simultaneous alcoholysis and gasproofing of tung oil are treated in an article by Goldblatt, Hopper and Paynor. Theirs is a report of a study to determine both the rate at which alcoholysis occurs under various conditions, and the effects on the conjugated triene during the alcoholysis. It was found that gasproof tung oil isophthalic alkyds of long-oil content can be prepared satisfactorily if the tung oil is alcoholized with such polyols as trimethylolethane, trimethylolpropane, or pentaerythritol at a temperature above 300°C., instead of the lower temperatures suually employed for alcoholysis of glyceride oils.[15]

McKinney and others deal with the preparation and some proper-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ties of chlorinated tung oil. Chlorinated products were screened as plasticizers for polyvinyl chloride resin. Over-all test results indicate that highly chlorinated tung oils are effective in lowering the milling temperature of polyvinyl chloride copolymers, but the products are not very flexible at room temperature.[16]

Kaufman and Gruber write of copolymerization in the field of surface coatings; the first article in their series deals with the reaction of cyclopentadiene on drying oils.[17]

Reactions of dienophiles with vegetable oils is discussed by Miller and others. In describing reactions of maleic esters with sulphur dioxide catalyst, they tell of experiments with safflower oil; direct reactions of dibutyl and dimethyl maleate with this oil were investigated.[18]

Gelb devotes an article to epoxidized glycerides cured with phthalic anhydride; these epoxy resins find widespread use in protective coatings of all kinds. The resins were made from phthalic acid and these epoxidized fatty glycerides: neatsfoot oil, lard oil, triolein, soybean oil, perilla oil, and trilinolein. The properties of the resins are reported —distortion temperatures, tensile strength, and modulus of elastic increase with the unsaturation of the glyceride precursor of the epoxy intermediate.[19]

Surface coatings from epoxidized oils are dealt with in two issues of PAINT AND VARNISH PRODUCTION. The first article discusses various reactions of epoxy groups of interest to the paint chemist, since they may lead to new and useful protective coatings; second article considers epoxidized soybean oil when used in protective coatings, particularly in alkyd resins.[20]

Treatment of drying oils with maleic anhydride and pentaerythritol is the subject of an article by Montequi, Doadrio and Fernandez Santiso. Drying oils, including linseed oil and bonito oil, were treated with maleic anhydride; when the product based on bonito oil was treated with pentaerythritol, it gave results comparable to those given by linseed oil, maleic anhydride and glycerol. Products were made with monoglyceride of phthalic acid, and were high in oil content; when dried they showed excellent water-repellency.[21]

Kraft and Forschirm write about monomer and amino resin modified tall oil and fatty acid alkyds.[27]

Testing

Hutchinson describes some applications of viscometry to drying oil research. Emphasis is placed on use of viscosity measurements for studing thermal polymerization of such oils, and for following the course of polymerization and polycondensation reactions during manufacture of oil-based surface-coating media. Study is detailed, and contains many valuable charts, graphs, and tables.[23]

Von Mikusch and Mehes write of Unsapol-based materials used to produce air-drying coatings; these are prepared by combining 3-4 fatty acid molecules by heat treatment with a catalyst.[24]

Patents

The oxidation of castor oil is the subject of a patent granted to Nichols. This describes a process comprising heating the oil in solution in an inert organic solvent and a ketone, to provide oxidized castor oil in which the predominant components are glycerides of 12-keto-oleic acid.[25]

United States patent 2,871,135

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(to Weiss) describes a drying oil comprising a mixture of glyceride of a higher fatty acid and a synthetic oil.[25a]

A process for improving the hardness of films prepared from synthetic hydrocarbon drying oils which comprises reacting the oil at 20-280°F. with oxygen, applying a film of oil to a surface, then reacting the oxidized oil with the reaction product of trimethylolpropane and tolylene diisocyanate, and finally subjecting a film of the resulting cross-linked oil to sulfur dioxide, is covered in United States patent 2,872,345.[25b]

Reisinger patented a drying oil.[25c]

A patent issued to Campbell covers air-drying resinous esters having an acid number less than 50, prepared by the esterification of ingredients consisting essentially of a partial allyl ether of pentaerythritol, a fatty acid substance, and a dicarboxylic acid, the proportion of these ingredients being such as to provide an approximate stoichiometric equivalence of hydroxyl and carboxyl groups.[26]

Modified oil copolymers were patented by Konen and Boller. These are copolymers of monomeric vinyl compounds of modified fatty acid esters.[27]

Christenson and Borman were granted a patent on coating composition vehicles from acidulated soap stocks.[27a]

Olson and Christenson patented modified fatty acid ester containing compositions.[27b]

A process for oxidizing hydrocarbon drying oils, said to yield excellent enamel bases, was patented by Segraves and Hillard,[27c] Marsel, and Happel patented an improved, impact stable, drying oil composition.[27d]

United States patent 2,907,669 covers treatment of hydrocarbon drying oils with epoxidized triglyceride oils.[28]

A process for production of improved drying oil compounds, which comprises heating an acid mixture with an epoxidized ester, is patented by Chatfield.[29]

Two British patents (to Dow Chemical Company) cover resinous aromatic polyether alcohols and preparation of phenolic-resin drying oils from these alcohols by esterification.[30,31]

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SOLVENTS and INTERMEDIATES

Solvents

MOST solvents are in good supply with very few exceptions. Cyclohexane, one of the few naphthene solvents, seems to be in somewhat short supply due to its use as a raw material for nylon. Heavy aromatic solvents should continue to be available in good quantities. Additional capacity has gone on stream during 1959 on both aliphatic and aromatic production to insure continued adequate supplies in the current year. The only exception may be benzene which is expected to continue in short supply at least for the early months of 1960.

Important technological developments continue to take place in this field, particularly in solvent improvement. This work has been confined to narrowing the boiling range of mineral spirits fraction and also improving the odor where possible. Mineral spirits solvents have been developed with a lowered end point which is finding interest in paint. There also has been a trend toward replacing odorless solvents with low odor products. Low odor solvents are normaly derived from selected crudes. This change has taken place because odorless solvents are not as compatible with most resins and also of lower prices on low odor mineral spirits.

Intermediates

The shortage of phthalic anhydride during the latter part of 1959 spurred considerable interest in isophthalic acid for alkyd formulations. Working with isophthalic acid requires a different processing technique than used with straight phthalic alkyds. Isophthalic acid has a higher melting point than phthalic anhydride; it also contains an extra molecule of water per molecule of isophthalic acid.

Important developments which have taken place in the field of intermediates include: the use of diphenolic acid recommended in formaldehyde condensation products of mixed diphenolic acid coesters and esterification reactions and the development of a water-solution coating; modification of PE alkyds with formaldehyde for improving film properties such as drying, flexibility, adhesion, and hardness; the use cyclohexne oxide derivatives to prepare coatings that cure rapidly at room temperature and at bake temperatures having excellent color retention when exposed to ultraviolet light and have good hardness, flexibility and resistance to caustic and water; and the use of limonene dioxide in the preparation of modified alkyds and polyesters.

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SC Solvent #1-A	202	235	113	25	2.5	67	+48	.8003	6.66	52%
SC Solvent #2	270	308	153	81	14.0	80	— 2	.8418	7.01	76%
SC Solvent #2-B	277	370	188	81	21.5	75	+12	.8388	6.99	68%
SC Solvent #3	356	400	204	135	64.0	72	+24	.872	7.26	69%
SC Solvent #28	329	379	193	122	51.0	73	+14	.8597	7.16	74%
SC Solvent #100	321	351	177	115	21.0	93.2	—37	.8708	7.25	96%
SC Solvent #150	369	412*	211*	152	98.0	91.8	—26	.8899	7.41	96%
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Solvents

The New York Paint and Varnish Production Club reported on the use of the automatic recording balance (third part of a study dealing with the evaporation rate of solvents). The apparatus described here (the Shell Thin Film Evaporometer) was designed to measure and record evaporation rates of paint solvents continuously. Loss of weight of sample is automatically compensated as the solvent evaporates. Five solvents — toluene, xylene, VM & P naphtha, mineral spirits and odorless mineral spirits —were evaluated. Results of the study showed several advantages for the Evaporometer: adequate precision is obtained, making it possible to use the apparatus for routine laboratory studies; sensitivity is such that the Evaporometer can be used on solvents of a wide range of volatility; a minimum of the operator's time is needed; flexibility of the instrument is such that it may be employed for determination of evaporation rates of both neat solvents and laid-down films. The investigators also forcast its usefulness for control testing of solvent evaporation rates.[1]

Why and how do you use hydrocarbon solvents in protective coatings, asks Barker; and answers in a two-part article which deals with the problem of predicting the behavior of solvents from their given specifications (with particular emphasis on the KB value). In Barker's work the validity of the KB value was investigated; the author concludes that this number does not always determine in advance the solution viscosity of a given system. Results with the aniline test are discussed; these, too, appeared inconclusive. In addition, dilution rates are dealt with in detail.[2]

Ferguson devotes an article to a suggested mechanism of flotation in paints. He investigated some of the variables involved, and concluded that flotation and flooding are interfacial phenomena, owing their differences to the nature of solvent evaporation within the systems in which they are present; that they are not merely results of gravity; and that apparently solvent evaporation from a paint film is a process in which rheological conditions, and probably interfacial conditions, play a part. In concluding, Ferguson lists some "guiding principles" for relieving flotation troubles; these include the incorporation of an extender, the addition of a silicone oil, of castor oil fatty acids, the formation of metallic soaps *in situ*, and the use of bentones — but flotation problems may be encountered where none of these treatments is effective[3]

A paper by Daggett discusses the importance of solvents in nitrocellulose lacquers. These lacquers require complicated mixtures of solvents; among those reviewed by Daggett are ester, ketone, alcohol, and blends. The properties of these compounds, and elements of their formulation, are detailed. A modification for spraying is included.[4]

Intermediates

A paper in *Chemical Engineering* discusses some new isophthalics, citing specifically the properties and applications of Oronite's isophthalic-based maintenance compounds, said to compare favorably with the epoxies, and to show interesting possibilities as interior maintenance coatings.

Sevestre writes on the use of hexylene glycol (2,-methyl-2,4-pentanediol) in emulsion paints; the compound is said to facilitate film formation and improve permeability, water-resistance, brightness, resistance to blistering and chalking.[6]

An article by Sherwood discusses the applications of trimethylol ethane (TME) and trimethylol propane (TMP), which have recently become available (Celanese Corporation, Heyden Newport Chemical Corp. and Trojan Powder Co.). The two polyols are as yet limited in their applications; their principal outlet lies in the production of alkyd resins for the formulation of surface coatings. TMP serves also in the production of polyurethane foams. Sherwood reports that the results of tests made to compare TME alkyds with those derived from glycerol show "marked" advantages—as regards color and gloss retention, heat stability, hardness and alkali and detergent resistance. These results should be compared, however, with German investigations cited by Sherwood.[7]

Hedlund devotes a paper to reactive silicone resins in architectural finishes; he emphasizes the versatility of alkoxy and hydroxy functional silicone intermediates. According to Hedlund, the most important application of silicone copolymers, at present, is to maintainance and trim enamels.[8]

An article by Mills discusses the chemistry and possible future applications of the beta-hydroxyl of glycerol.[9]

Patents

United States patent 2,873,202 covers several substances — ditetradecyl, dihexadecyl, dioctodecyl and dodecyloctadecyl ethers—used to improve the water-repellency and mar-resistance of resinous coating compounds.[10]

Ingram and Irvine patented quick-drying oleoresinous coating compositions containing resorcinol-*p*-alkylphenol-aldehyde resins.[11]

Coating compositions from polymers of alkoxyalkyl α-alkylacrylates were patented by Cupery.[12]

Hanle, Tringali and Yuska were granted a patent on film-forming copolymers of formaldehyde-acid esters of phenoxy-ethanol-formaldehyde condensation products with ethylenic monomers; the films on glass or steel are said to be hard, tough, alkaline-resistant.[13]

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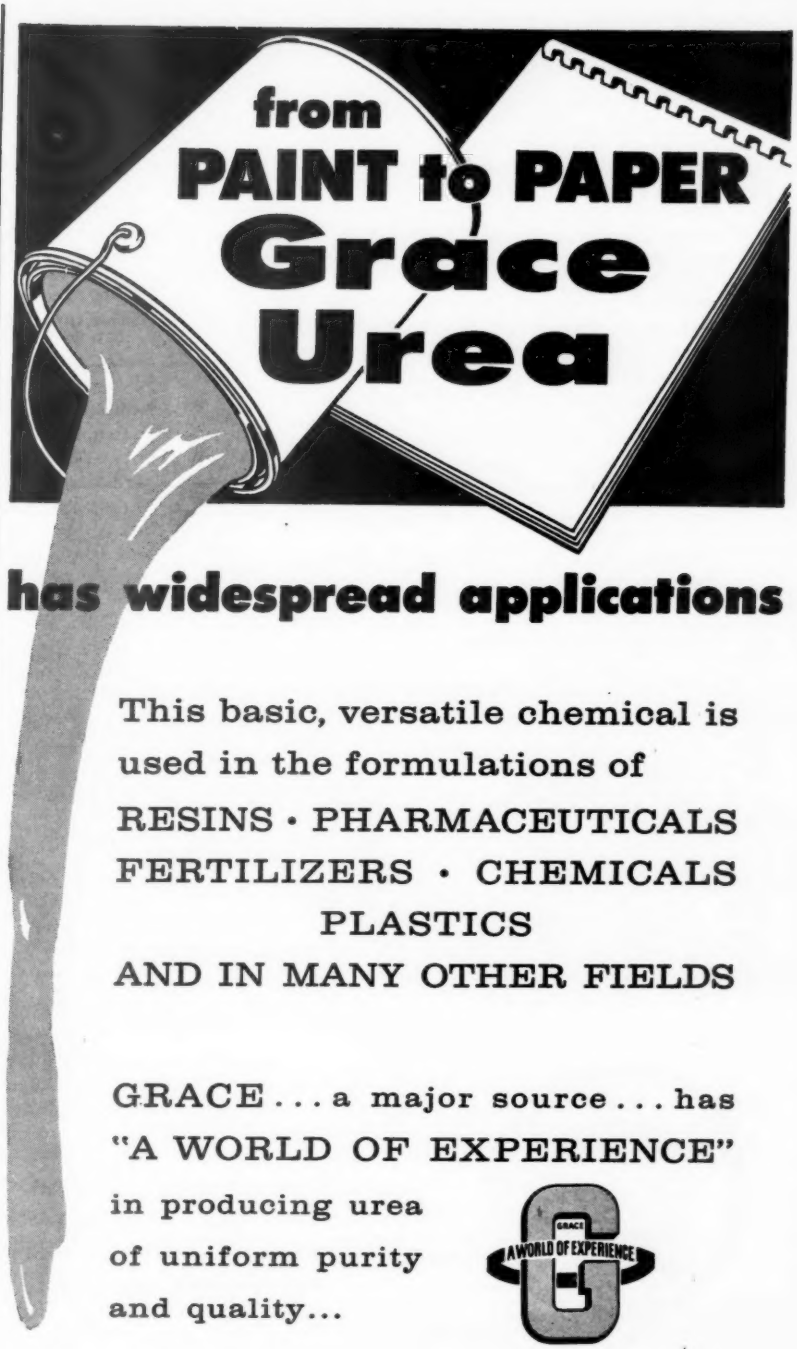
For more information circle No. 40—last page

Isophthalic Acid

A detailed article by Burkel deals with isophthalic alkyds in coatings. This would perhaps seem more appropriate under the heading of alkyd coatings, but Burkel's work deals significantly with isophthalic acid, which is chemically similar to phthalic anhydride, and is useful in the formulation of alkyd resins. It should be noted that, while the compound is *chemically* similar to phthalic anhydride, its *physical* properties vary widely: m. p. for IPA, for example is 354°C., for phthalic anhydride it is 131°C. (This accounts for the difference in sublimation rates, among others.) Burkel discusses two factors in formulation—linearity and homogeneity, and how the three isomers of isophthalic acid may be used to solve some of the problems posed by the two factors. Phthalic anhydride does not seem to have the functionality potential of the other two isomers. Orthophthalic tends to form lower molecular weight species. Isophthalic will give better resins than orthophthalic because of its molecular configuration and its greater stability. Two basic characteristics of isophthalic are important in processing isophthalic alkyds: isophthalic is an acid where orthophthalic is an anhydride; and secondly, isophthalic has a much higher melting point than orthophthalic. Burkel reviews methods of processing: fusion and open kettles, solvent cooking, and the fairly recent acidolysis technique. He points out, in conclusions, that isophthalic modified oils are being used as house paint vehicles, in exterior and interior enamels. In many other applications, isopthalic resins show considerable promise. Thus, in maintenance paints phthalic based vehicles give better adhesion to multi-mil paints (used for coating metal), and add chemical resistance. Recently, use of isophthalic polyesters for anticorrosive paints has shown interesting results; they have outstanding adhesion and good chemical resistance.



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For more information circle No. 42—last page

PIGMENTS

WITHIN recent years trends in the use of color in trade sales and product finishes (particularly automotive) have been toward brighter shades. In addition to being bright, these colors must be light-fast, resist weathering and heat, and be chemical-resistant. Moreover, they must have good dispersing properties to facilitate their incorporation into all types of conventional and aqueous vehicles.

One of the major develpoments in the pigment field was the availability of a new yellow shade of phthalocyanine green. Heretofore, yellow shade of green were possible only by mixing yellow and green pigments. This pigment is claimed to be the yellowest green pigment available. It has high tinting power and is stable to organic solvents, acid and alkalies. Another development in the phthalocyanines was a greener shade of phthalocyanine blue pigment which exhibits good dispersing properties, excellent acid and alkali stability, light-fastness and durability.

Work in fluorescent colors was directed toward the manufacture of pigments with more uniform and finer particle size and possessing increased resistance to solvents and plasticizers. These pigments are recommended for toning non-fluorescent colors to produce brighter shades of regular paint lines.

Other pigment developments were: gold and bronze metallic colors with added brilliance; a tinting vehicle common for both organic and inorganic pigments; a strontium chromate for metal protective coatings which has low reactivity in catalyzed epoxies; fluid toners for polyesters, and a series of zinc oxides which feature improved wetting and dispersion properties.

One of the most interesting technological developments in extender pigments has been the introduction of surface modified hydrated aluminum silicates. In the past the hydrated aluminum silicates have been considered to be a hydrophilic type pigment, in that they are wet with water more easily than with oil. Modification of the surface produces a more hydrophobic type of surface. This permits the advantages of the hydrated aluminum silicates to be used in other fields such as oleoresinous type of paints.

In the field of magnesium silicates, a product with controlled particle size distribution was made available. Having an average particle size of 5.0 microns, this extender is claimed to have good white color, good suspension properties, is chemically inert, can be used as a stir-in pigment, imparts film toughness, and adhesion, aids in flatting, and exhibits improved sanding properties.

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For more information circle No. 43—last page

General

Paint Manufacture carries two literature reviews on pigments and colors. The first of these deals with color and color measurement, mixing and dispersion, and extenders; thirty references are cited. The second literature survey covers optical properties, pigment dispersion, and specific pigments; thirty-six references are cited.[1]

An article by Cowling and Noonan deals with fluorescent high visibility paints for aircraft. Such paints are used to minimize mid-air collisions of aircraft. It is now possible to formulate these paints to maintain satisfactory color and fluorescence in exterior exposures for periods in excess of one year. Cowling's paper discusses the essential properties of daylight fluorescent paints for aircraft use; proper choice and specification of color, and spectral radiance, are covered. An interesting feature of this article is a series of detailed definitions of terms.[2]

In a paper on basic lead silicochromate anticorrosive pigment, Eickhoff and Pitrot describe the properties of an effective anticorrosive pigment patented by them and assigned to National Lead Co. Advantages claimed for the pigment are resistance to chalking and color change, and package stability.[3]

Fraser and Fairhall report results of a laboratory study of the solubility of red lead paint in water. Their work covered solubility of red lead powder and of lead from three types of red paint; this is a subject on which (the authors say) little has been published. From an investigation of a number of variables affecting lead solubility, Fraser and Fairhall conclude that the newer phenolic and vinyl base paints present less of a public hazard than do oil base paints.[4]

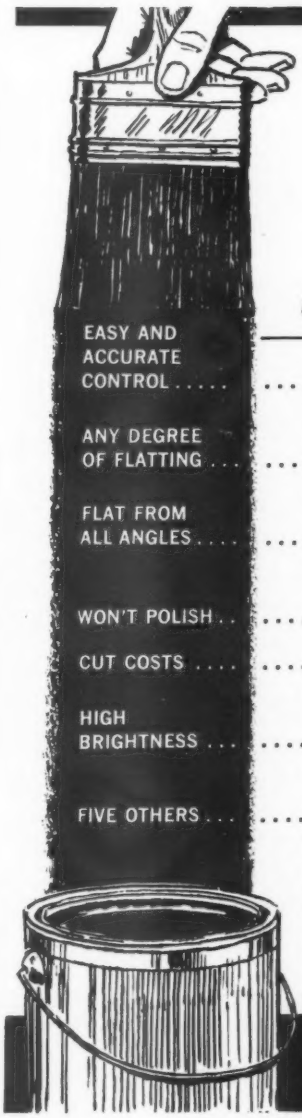
General Aniline and Film Corporation announced a new phthalocyanine pigment, Heliogen Viridine Y, described as the "yellowest" permanent green pigment yet developed. It has a wide usable range of shades in paints and plastics; high tinting power, and is stable to organic solvents, acids, and alkalis. It is available in lakes, toners, dispersed powders, water dispersions, pastes, and presscakes.[5]

Jefferies is the author of an article devoted to the behavior of titanium dioxide pigments in alkyd/amino resin systems. He discusses the components of the system: solvent, alkyd, amino resin, and pigment. A detailed review of work done on the effect of resin concentration on pigment dispersion follows. An intensive consideration of ball-milling and of alkyd-amino base resin ratio concludes the article (first of a two-part series), which is notable for the number of valuable charts, graphs and tables it contains.[6]

Reeve and Botti write about lightfast quinacridone red pigments. The properties of Monastral reds and violets are described. In addition to outstanding durability in pastels and polychromate finishes, these pigments offer color brilliance and excellent resistance to heat, chemicals, and solvents.[7]

A review article in *Peintures, Pigments, Vernis* covers the properties and applications of lithopone.[7a]

Paint Journal carries a paper on white lead; the manufacture, applications and advantages are reviewed.[7b] The same journal has an article dealing with cadmium pigments for vehicle finishes; the remarkable stability of these pig-



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For more information circle No. 44—last page

ments under severe conditions has increased the demand for them.[7c]

Pepper considers applications and properties of zinc oxide in architectural finishes.[7d]

Extenders

The June issue of *Official Digest* carries a nine-part symposium dealing with the effect of physical characteristics of white and extender pigments on paint film properties. First paper, by Zettlemoyer, discusses generally some of the properties of pigments and extenders that directly affect the manufacture and use of organic coatings; these include wetting, dispersion, flow properties, optical properties, and stability.

The second paper in the symposium (by Elm) deals with size and shape properties of representative white hiding and extender pigments. It is pointed out that these pigments, as employed in the paint industry, fall into two groups: that which includes titanium dioxide and zinc oxide, and is made from fume by condensation or from solution by precipitation; and that group (which includes most of the extenders) derived from natural deposits by grinding. The article considers particle shape and size in connection with a number of properties of finished film: consistency, gloss, retention.

Subject of the third paper is the relationship of pigment packing patterns and critical pigment volume concentration to film characteristics and hiding power (Stieg). The author, in summarizing results of his studies, points out that pigment packing patterns and the void spaces which they create are controlling factors in the development of such paint properties as resistance to blistering, resistance to rusting in metal finishes, enamel hold-out, ease of stain removal, hiding power of white pigments, high dry hiding, color uniformity in flat wall paints, sheen uniformity in flat wall paints, wet-to-dry film shrinkage, and relative viscosity. He advocates use of critical pigment volume concentration curves, developed by the simple spatula oil absorption method, as of great value to the formulator in controlling the properties just mentioned.

In the fourth paper in the symposium Naylor discusses measurement of water absorption and its effect on the rheological properties of paint. The technique he describes is said to correct certain errors to which existing methods are liable. In his procedure, the viscosity of a 60% solids pigment water dispersion was used as an indication of water absorption. The viscosity of this system will vary with the addition of dispersant. Too much or too little dispersant will result in a viscosity higher than a minimum point. After determining the dispersant required to reach exactly the minimum value, water absorption is reported as the dispersant required and the viscosity.

Ferrigno, in the fifth paper of the symposium, considers the effect of extenders on the optical properties of air drying alkyd emulsions and styrene-butadiene latex paints. In a highly technical paper, he compares minimum and maximum particle size extenders in single extender paints at 30% and 70% pigment volume concentrations, and describes blends made to obtain data at intermediate PVC's. Results indicate that flatting increases with increasing particle size in both systems. There is a similarity between the two systems with regard to other properties (for ex-

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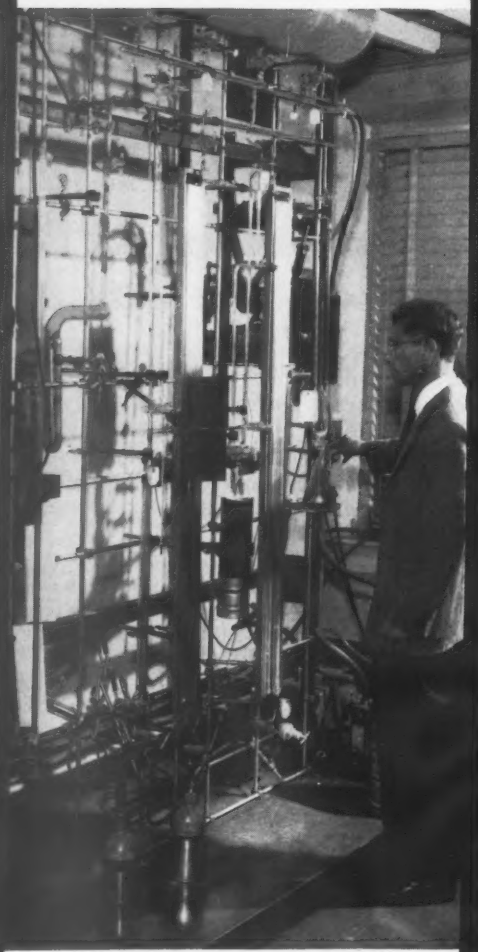

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For more information circle No. 47—last page

ample, soil removal properties of both systems seem to improve as particle size increases). Tables show viscosity and pH values, enamel hold-out characteristics, yellowness and color uniformity of both systems, gloss retention and hiding properties of extenders.

Sixth paper of the series is devoted to a discussion of relative flatting efficiency of extenders and the effect of these extenders on sheen uniformity, color uniformity, suction spotting, and enamel hold-out in solvent systems. The paper (by Morgan) is a direct comparison of sixteen extender or extender combinations in alkyd systems for the properties just noted.

The seventh paper in the symposium (Hall) deals with the effect of particle size distribution of pigment and pigment volume concentration on flat wall paint properties (solvent type). Formulations investigated included only pure titanium oxide, diatomacous silica, and calcium carbonate as pigmentative. Five different calcium carbonates, of different particle size distribution, were made into alkyd flat wall paints, through a range of pigment volume concentration (60, 65, 70, 75); several properties of these paints were investigated: reflectance, hiding power, change in hiding power on drying, tinting strength, color uniformity, color change on drying, and stain removal, which were plotted against pigment volume concentration. Conclusion is that particle size distribution of the pigments in a flat paint, and the pigment volume concentration, have a large effect on the properties.

Larson is the author of the eighth paper in the series. His article discusses two-component extender systems in emulsion paint. Work was confined to extenders most frequently used in latex paints, and relatively inexpensive. The butadiene-styrene emulsion was employed. Properties studied were: reflectance, contrast ratio, yellowness, color uniformity, enamel hold-out and viscosity. Results obtained indicate that a combination of extenders gives the optimum properties. At all pigment volume concentration levels investigated, use of hydrated aluminum silicate with 25% magnesium silicate appeared best.

For more information circle No. 48—last page →

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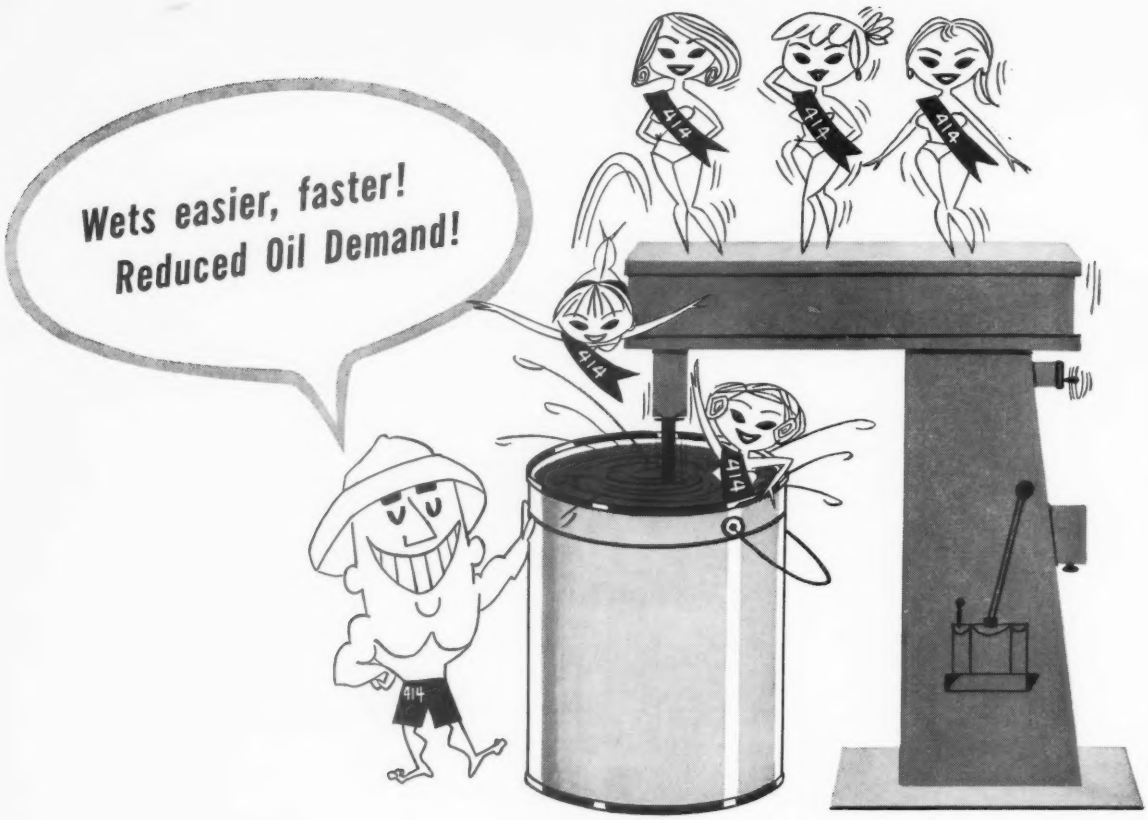

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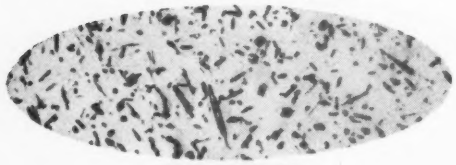

AZO ZZZ-11
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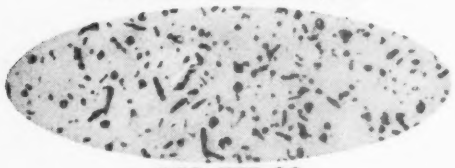

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For more information circle No. 51—last page

The Hegman test, as it is related to the average large partical of extender pigments in paint films is the subject of the final paper in this symposium (by Smart).[8]

An article by Kronstein and others in PAINT AND VARNISH PRODUCTION deals with the effect of pigment particle shape and size on moisture permeability of organic coatings. Tests made on several paints indicated that particle and shape considerably influence density or the films, and particularly water-vapor permeability. Investigations were made with so-called non-reactive pigments, ruling out the possibility of chemical reactions between the vehicle and the pigments under study.[9]

Writing in the *Official Digest*, Stieg expresses the opinion that "the increment of hiding power developed by each individual titanium pigment particle in a paint is a function of the distance that it is separated from all other similar particles in the dry film." An inference of this theory is that the hiding power produced, per pound, at any given pigment volume concentration level, may be calculated in a simple formula based on the spacing of the pigment particles; this formula Stieg develops. He shows also that the role of extender is entirely dependent upon its particle size: fine particle extenders increase hiding power, and *vice versa*.[10]

Special Studies

A paper by Lilley and Phelps deals with the use of varying quantities of relatively fine particle size extender—of high oil absorption—to produce different degrees of flat hiding power. The effects of combinations of these extenders on wet-to-dry hiding power and wet-to-dry color change are considered. Data on contrast ratio, reflectance, color uniformity, enamel hold-out, and stain removal are included.[11]

The effect of pigments on the rate of deterioration of paint films is studied by Rosa and Elm, who report on an infrared absorption spectroscopic investigation in three vehicle systems (long-oil alkyd, acrylic resin solution, and polyvinyl acetate solution); results showed little difference in rate of deterioration for the three types.

Greatest resistance against destruction by ultraviolet light was imparted by zinc oxide.[12]

Particle size and paint manufacture are discussed in an article by Wade. Results with "Micronized" pigments, grinding with a flowable paste on a Keenok 6 in roller at low pressure, were found to confirm conclusions (dating to 1953) that very rapid dispersions, at least with ordinary gloss paint, can be effected (in 4-20 minutes). Best result was obtained by using wetting power of the solvent, thus working at low resin solids solutions.[13]

A new assessment of oil absorption is attempted by Marsden. Tables in his paper show oil-absorption of ferride yellow, lithopone, Prussian blue, zinc sulfide and lithol red. The British Standards method was employed and checked, and its variable features investigated. In general, the end point of the British Standards test was quite definite, and supplied an excellent criterior for completion of the test.[14]

Dealing also with the oil absorption, as well as the critical pigment volume concentration, of pigment systems, is an article in *Official Digest*. Spatial rub-up oil absorption determinations were used to calculate absorption and CPVC of multicomponent pigment systems. Ten pigments and binary mixtures were studies. Results obtained were considered satisfactory for mixtures of more than two components. This very interesting study considers such problems as operator bias and how to correct it, and pigment packing effects.[15]

A paper by Weber describes rotational viscometer measurements of pigments in oil. A Pawlowski (Bayer) viscometer was used to study flow behavior of white pigments milled in oils. Factors affecting viscosity are discussed: pigment volume concentration, type of pigment or extender, binder, particle size, and temperature. Thixotropy is determined by measuring breakdown time.[15a]

An inexpensive spectrograph is described by Andrews. The instrument has been found useful in qualitative analyses of inorganic paint pigments and new materials. Easily constructed, it can reveal

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18
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the presence of most metallic elements of pigments and of minor components and impurities. A simple comparator is used for wavelength determination.[16]

Berger and Weber discuss the measurement of the brightness of white pigments.[16a]

Ulrich, Kelley and Nelson write on evaluation of colorants by a spectroreflectometer; properties investigated included reflectance, fluorescence, and infrared absorption.[17]

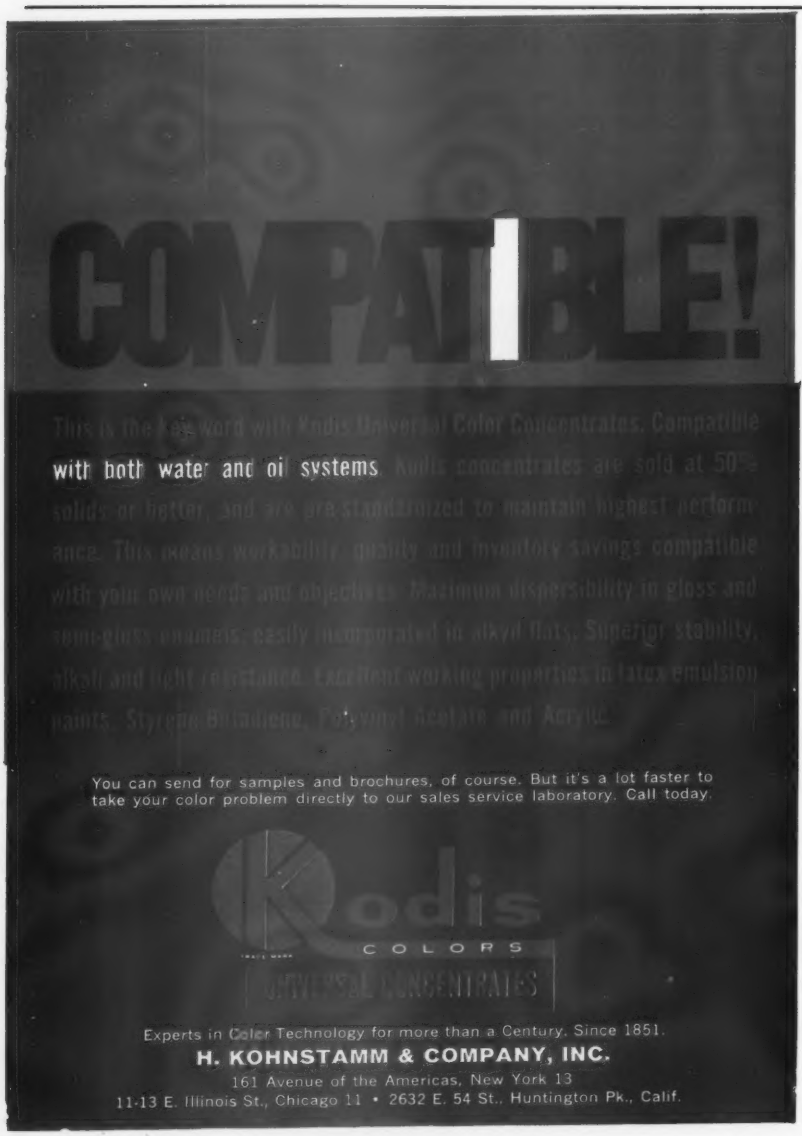
Color preference and subjective color structure are the subjects of a study reported by Hefner and Zinnes. The work they describe has been going on at the University of Michigan, and is supported by a grant from the Paint Research Institute. Goal of the study is basic information about the nature of preference judgments: how preferences are related to psychological color-order systems, how they change over time, how they differ for different objects and when different numbers of colors are available to be chosen. The authors present three theories to cover some of these problems, and postulate a concept of "color preference space", a new kind of color-order system.[18]

An article in *Verfkroniek*, dealing with measurement of light fastness of pigments, discloses two new techniques. The better of the two runs as follows: The pigment sample is exposed simultaneously with a set of standard samples fast to light. Sample and standard are partly covered by a non-transparent strip, which is then removed to make possible a comparison of exposed and unexposed parts. Changes in sample are numbered according to corresponding standard sample. After a second exposure and comparison, right evaluation is determined.[19]

Exposure studies of organic pigments in paint systems is the subject of a paper by Vesce. This appears to be a definitive study of the light fastness properties of such systems, based on outdoor exposure tests. Each of the pigments was incorporated into five different paint systems, and each pigment-vehicle system was prepared at three concentrations with white. Color changes observed were reported in objective units of change. Exhaustive tables are included.[20]

Kindervater writes on critical investigations of the permeability method for the determination of the specific surface of pigments. This is a study of 1) which kind of specific surface is measured by Carman's permeability method; 2) under what conditions this and the Brunauer, Emmet and Teller (BET) method give comparable results. The former test depends on the porosity of the powder (to obtain maximum surface, porosity must be of 0.4-0.5 range). Measurement of specific surface by permeability method on zinc sulfide, lithopone, and silica fillers gave 70-80% of values obtained by BET method. Electron microscope measurements show that permeability method measures a kind of geometric surface.[21]

The effect of raw materials on the leafing of aluminum pigments in varnishes is the subject of a paper by Pfau and Grossman. Effects of solvents were noted at 15% and 12% pigment content with the spatula test method (ASTM D-480-51). Initial leafing generally increases with increasing density of solvent. High acid number decreases leafing stability of rosin, coumarone, and alkyd vehicles, but not of phenolics.[22a]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3X	98.5	<1	76-81	37-41	120-140	fibrous	general purpose pigment for oil, oleo-resinous, water emulsion interior and exterior paints.
FINE TEXTURE	99.5	1½-2	76-83	37-42	110-130	fibrous	slightly higher consistency than 3X; improved Hegman; for interior and exterior paints.
5X	97.5	<1	87-100	47-53	145-165	fibrous	high oil absorption; most fibrous Asbestine; higher consistency range; for exterior oil and water paints.
325	99.98	4-4½	75-81	37-41	90-120	semi-fibrous	"tailored"** talc; medium oil absorption and consistency; for oil and water paints.
425	99.99	5-5½	77-85	45-52	110-140	semi-fibrous	"tailored"** talc; medium/high oil demand; for industrial paints.
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*Hegman obtained by hand mixing in linseed oil.
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Patents

A pearlescent type coating was patented by Blank. This comprises a water-insoluble film-forming lacquer and mica having a particle size ranging from 1-100 microns; pearlescent pigment to binder ratio, by weight, is from about 3:1 to about 7:1.[23]

A patent granted to Knoll and Hurd covers a process of making wet aluminum pigment containing non-leafing aluminum flake particles; this comprises attrition of aluminum to form flake particles in the presence of a lubricant.[24]

Phthalocyanine pigments are covered in a patent issued to Siegel. Such a pigment, highly resistant to flocculation in an organic coating vehicle, consists essentially of a mixture of a major amount of a copper phthalocyanine pigment and a minor amount of a substituted copper phthalocyanine.[25] Phthalocyanine pigments are also the subject of a patent granted to Brouillard and Katz; theirs is a blue phthalocyanine pigment composition consisting essentially of a copper phthalocyanine and about 0.5-5% of an alkaline earth metal salt of sulfonated zinc phthalocyanine, containing about 1.25-2.5 sulfonic acid groups per zinc phthalocyanine molecule by weight of the copper phthalocyanine.[26]

Anthraquinone azo pigments were patented by Bergstrom.[27] Halogenated phthalocyanine pigments were patented by Randall and Taras.[28]

A paint base made up of a dispersion of inert extenders in a compatible film-forming vehicle, a solvent for the vehicle, and preferably driers and antiskinning agents is subject of a patent issued to Caron and Etheridge.[29]

Gagliano and Daly patented cadmium-sulfide-mercury-sulfide pigments; crystals range from orange through red and maroon.[30]

Jackson patented chromic hydroxide-ferric hydroxide pigments and coating compositions containing them; the pigments are said to extend the life of the coating without causing any change in color or opacity.[31]

Composite antimony oxide-silica pigments were patented by Dunn and Kushner.[32] Giness and Twitchett patented new azo pigments expecially useful in the manufacture of lacquers.[33]

A British patent covers manufacture of titanium dioxide powders; the finely divided titanium dioxide powder can be brought into the form of an aggregate, facilitating mixing with other pigments and dispersions.[34] Another British patent covers chlorination of metal-free phthalocyanine; the dye obtained is yellowish-green, and is useful in lacquers, enamels, paints, etc.[35] (This pigment is discussed more fully above.)

Balfe and Edgerley patented an aqueous pigmented dispersion.[35a] Storage-stable pastes, paints containing aluminous pigments were patented by Hawkins and Bobalek.[35b]

A Japanese patent, issued to Meguro, covers an oil-soluble pigment; a ferric chloride solution and a sodium dodecyl sulfate solution are added to red iron oxide.[36]

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DRIERS and ADDITIVES

IN ANALYZING the trends in the use of paint driers and additives, one must take into account the tremendous impact that water thinnable paints are making in both the architectural and industrial fields.

As a result of these trends, the use of standard type of naphthenate, tallate, and octoate driers has dropped, and will undoubtedly decrease further as water thinnable paints take a larger slice of the paint market.

Whereas driers seem to show a decreasing trend; additive usage has gone up which can be attributed to the spectacular growth of water-based paints. This trend has resulted in a big market for bactericides, fungicides, thickeners, anti-rusting agents, freeze-thaw stabilizers, dispersing and deflocculating agents, etc.

It is interesting to note that additives are finding many new uses in solvent paints. Such additives are specially designed to impart certain properties to the paint or correct or improve properties in which the paint may be failing.

There are additives that will reduce or eliminate mildew, will increase or lower viscosity, improve flow and levelling, reduce or eliminate settling, reduce or eliminate flooding, floating, and silking, sagging, improve pigment grinding properties, etc.

Here is a rundown of new developments which have taken place in the additive field: water soluble driers for water-based paints are said to impart increased hardness and scrub resistance, and improve resistance to water spotting; modified aluminum isopropylate recommended for curing epoxy resins, for modifying phenolics, alkyds and drying oils in order to obtain improved film properties; a dispersant with a wide range of compatibility, particularly adaptable in color machines or tube systems; concentrated solution of phenyl mercury acetate to give maximum resistance to putrefaction in the container and resistance to mildew on the dried film; plasticizer-surfactant for emulsion paint systems; a mildewcide-preservative available in a premeasured water soluble package; pyrrolidone type dispersing agents have been found to be effective as a dispersing agent for pigments in lacquers and also to impart softness of grinding properties to pigments when ground on conventional types of grinding equipment; and a special stabilizer for minimizing the deleafing of aluminum pigments in alkyd-base aluminum paint.

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For more information circle No. 57—last page

Driers

An article in *Official Digest* reports results of a study of adsorption of 6% cobalt, 4% calcium, 6% manganese, and 24% lead naphthenates by titanium dioxide and carbon black pigments. Research was conducted in an anhydrous system toluene/drier/pigment at constant temperature. All white pigments and most of blacks behave similarly and in the beginning adsorb drier at a very high rate. White pigments adsorb calcium in larger amounts than any other drier; carbon blacks adsorb more lead drier. Apparently only small portion of available surface is active in adsorbing drier. Under the experimental conditions given here, the pigments studied adsorbed greater amounts of drier than those normally used in paint systems.[1]

Ford reviews driers for decorative gloss paints; the investigations he reports studied effects of temperature and humidity on drying times of media for such paints. Three vehicles were tested, with a number of metallic soaps as driers. The work was restricted to an examination of the drying properties as measured by the Beck Koller drying recorder, and did not include any assessment of the other properties of a paint which can be affected by driers.[1a]

Two articles deal with zirconium driers. Burger describes the properties and applications of Zirco, said to be the first major advance in the industry in thirty years.[1b] Finlay and Proudley discuss the evaluation of zirconium driers; the tests they report covered zirconium with cobalt, calcium and manganese. Air drying and stoving systems were checked. Marked variance in results obtained using zirconium was noted; but the authors consider zirconium interesting enough to repay further study where drying is a problem.[1c]

Aluminum Compounds

An article by Rinse deals with aluminum tallate polymers. Trimer aluminum tallates are discussed. The compounds are acid-acceptors with good wetting properties; they can be used as gelling agents for organic solvents, oils, and bitumens; as wetting agents for pigments; as acid binders; as core binders; for the preparation of greases; for the production of linoleum and asphalt tile; and as stabilizers for chlorinated rubber, polyvinyl chloride, and other plastics.[2]

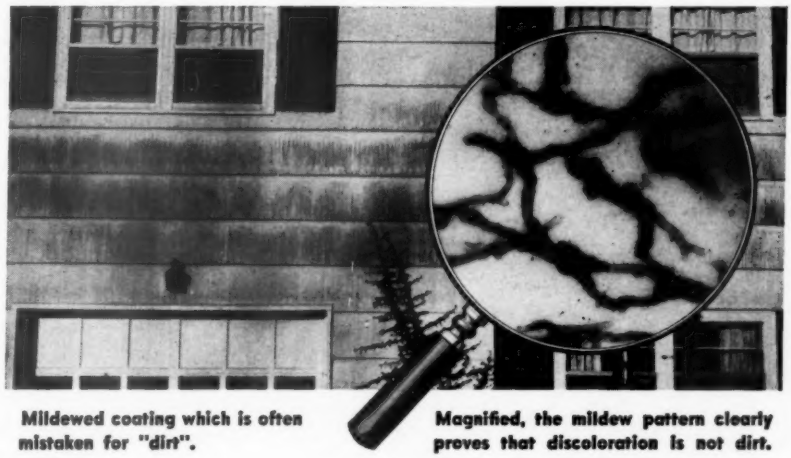
Weiss writes of organic aluminum compounds in paints. Data he cites indicate that improvements in drying times and hardness of films can be achieved by introduction of aluminum complexes into paint media; non-drying oils can be given drying properties.[3]

Thickeners

A paper in a Russian source discusses the properties of carboxymethylcellulose. Mechanical properties are cited, and these factors are discussed: viscosity, molecular weight determination by the method of osmosis, determination of the degree of polymerization and of substitution, the dielectric properties, surface-active properties, and adsorption. In addition, some comment is made on the biological resistance to the compound.[4]

Surface-Active Agents

Gardner writes of work carried out in the laboratories of Witco Chemical Company in evaluating such agents in emulsion paints. Conclusions were based on check of the efficiency of surface-active agents as emulsifiers, dispersing aids, and wetting agents. Experiments were carried out with buta-



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For more information circle No. 58—last page

diene-styrene vehicles, acrylics, PVA post-plasticized and copolymer emulsions, and their alkyd modifications. Formulations are cited.[5]

Experiments with poly (vinyl acetate) emulsions in paints are described by Pleysier. The use of one nonionic (Lissapol N) and one anionic (Oraton 732) surface-active substances and of protective colloids (hydroxymethylcellulose, not flocculated), produced excellent pigment dispersion and stability of paint. Weather resistance was found to vary with different pigment compositions in the PVA emulsions.[6]

Moilliet deals with surface activity: the general concept and some consequences. His article is a theorectical discussion of the relationship of surface activity to surface-active agents, the effect of the latter in lowering boundary tensions between various interfaces, and the interface stabilization that surface-active agents bring about.[7]

The use of non-ionic surfactants in paints is discussed by Gantz and Sumner; the compounds are said to facilitate polymerization in latex emulsions, improve their properties, and increase wetting and dispersion of pigments.[7a]

Miscellaneous

Riese considers defects of emulsion paints and their prevention. He cites the additives necessary to lend corrosion protection, stability, storage change.[8]

An article by Genin discusses the use of formaldehyde in the treatment of casein to be used in the manufacture of paint. Employment of the aldehyde itself, or of compounds releasing it, is suggested to prevent the casein in casein paints from adsorbing moisture even after drying on walls.[3]

Hedlund and Meath discuss silicone additives for paints, reviewing the use and performance qualities of resins and fluids. Particular reference is made to several Dow Corning products. Properties cited: resin additives increase heat stability of organic coatings and improve their resistance to water and weathering. Silicone fluids improve leveling and flowout, reduce floating, increase mar resistance, and produce hammer finishes.[9]

Radioactive isotopes in lacquers and varnishes are dealt with in an article in *Verfkroniek*.[9a] Silicones in industrial finishes are reviewed by Hedlund.[9b]

In an article devoted to use of zinc stearate in lac sealers for furniture finishes, Stewart and Surano point out that urea and melamine-modified alkyd-type finishes give greater toughness and mar resistance.[10]

Rolles discusses leaf stabilization of aluminum paints—a problem related to an oleophobic stearic acid film held at the flake surface. Rolles' paper reviews the effect of organic mono- and dibasic acids on leaf stabilization; stability in highly acid paint vehicles and Alcoa Stabilizer #5 in paint systems are considered.[11]

Pelz writes on light stability of transfer metal coatings, pointing out that the yellowing ascribed to coatings may be the result of optical phenomena or of uneven film thickness. Certain additives selectively absorb ultraviolet rays, hence all raw materials should be chosen carefully for maximum stability. Accelerated ultraviolet lamp tests may give false results with diol lacquers known to be satisfactory. Radiation with xenon high-pressure lamp equipped with filters correlates best with average daylight exposure.[12]

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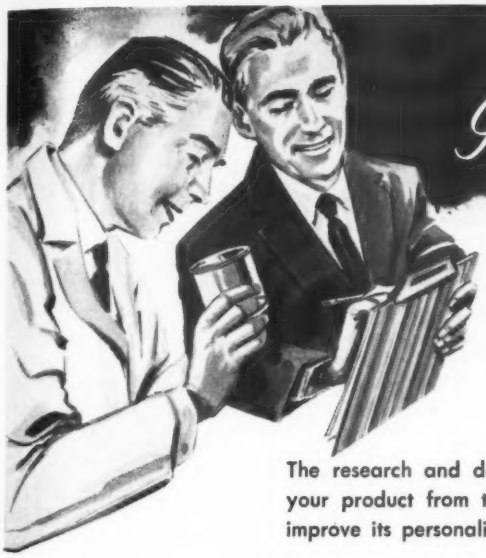

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For more information circle No. 62—last page

The effect of release agents and additives on the adhesion of latex and alkyd paints to plaster is discussed by Hoffman and Ridge. Retarders and release agents apparently do not impair adhesion in normal usage, and somewhat improve adhesion of wet films of latex paints. Similarly, acceleration with precipitated gypsum did not seem to affect adhesion.[13]

In *Peintures, Pigments, Vernis,* Sevestre writes on the use of hexylene glycol (2-methyl-2,4-pentanediol) in emulsion paints. Addition of this compound is said to facilitate film formation and improve permeability, water-resistance, brightness, blister-resistance, chalking. Overuse may cause phase transfer of some organic pigments or excessive swelling of resinous constituents.[13a]

The toxicity of some cross-linking agents is subject of a paper by Walpole and Williams. They point out that use of epoxides and diisocyanates may be attended with risk; some members of both groups are highly toxic. For example, the risk of skin cancer from certain biepoxides is real, if these are not employed with care. Similarly, inhalation of isocyanate vapors may be attended with temporary disabling affects.[14]

Patents

Schmutzler patented a method of stabilizing pigment-containing alkyd resins with alkyl phosphates or phosphites.[15]

Mixed aluminum-soap flatting agents were patented by Cunder and Licata; these are said to be useful in paint, lacquer, and varnish compositions, and to have superior heat stability.[16]

Cellulosic varnishes and paints are covered in United States patent 2,883,350, which describes a process for opacifying such varnishes, by incorporation of lithium chloride.[17]

A water-repellent coating, an organic paint and varnish composition dissolved in an organic solvent and containing a synthetic wax, is patented by Chapman.[17a] Wax-fortified paint and varnish compositions are patented by Wilder.[17b] A water-repellent for masonry is subject of United States patent 2,905,562.[17c] Wegler and Frank patented accelerators for

cure of nonbasic epoxide resins; 1-10% N-containing di- or polyepoxides are added.[17d]

Van Loo and Bitter patent a process for preserving gloss in paint films by addition of a sulfosuccinate.[17e]

Colloidal oxide aerogels as stabilizers in pigmented coatings and adhesives are patented by Kloepfer and Schweitzer.[17f]

A British patent deals with stabilized oleaginous products for paints; the presence of 0.5-7.5% dibasic lead phosphate is said to inhibit decomposition of hydrocarbon oils, esters, and alkyd resins, and to prevent scaling in paints.[18]

A Russian patent covers asphaltite for use in paints and varnishes; tarry, paraffin-free petroleum or its residue is extracted with silicone dioxide or natural clay, oxidized with air and converted to asphaltite.[18a]

Microbiology

Hoffman, Kaye and Feazel discuss sporicidal surface coatings. In their work, over forty compounds were incorporated into vinyl coatings and tested for their activity. Self-sterilizing coatings were prepared by incorporating a formaldehyde polymer (such as paraformaldehyde) into the coating. The authors concluded that the sporicidal activity of the latter type of coating is probably due to the formaldehyde vapor liberated from its polymer, and that such a disinfectant is more effective in a coating than commonly used disinfectants against microorganisms at low relative humidity.[1]

A review article in *Paint Journal* deals generally with the subject of anti-bacteriological paints.[1a]

An article in PAINT AND VARNISH PRODUCTION covers surface coating vehicles with built-in fungistats. In the tests described in this paper (Goldblatt and others), vehicles based on tung oil and containing chemically-combined, potentially fungistatic acids were prepared; acids included propionic, undecylenic, and sorbic. In laboratory tests, yellow pine and maple were coated with experimental paints and exposed outdoors for 18 months. Best results were obtained with a tung-oil tripropionic paint. Short-term laboratory tests for other fungistat were considered sufficiently promising to justify further tests.[2]

Microbiological deterioration of water-thinnable coatings is subject of a paper by Ross and Buckman. Paper chromatography was used to identify products of aqueous microbiological attack of modified celluloses, casein, or α-protein thickeners.[3]

A letter by Newton in *Journal of the Oil and Colour Chemists' Association* deals briefly with the inhibition of mold growth by zinc oxide, reporting successful results.[4]

Patents

A patent granted to Buckman Laboratories, Inc., covers paints incorporating barium borates; the resultant paints are said to have improved mold resistance, little tendency to collect dirt, and—if titanium dioxide is added—not to chalk readily.[5]

A mildewcidal and flameproofing composition is the subject of a patent issued to Giordano and Straka. This is a firbous material impregnated with a mixture of copper antimonate and a halogenated organic compound.[6]

circle No. 63—last page

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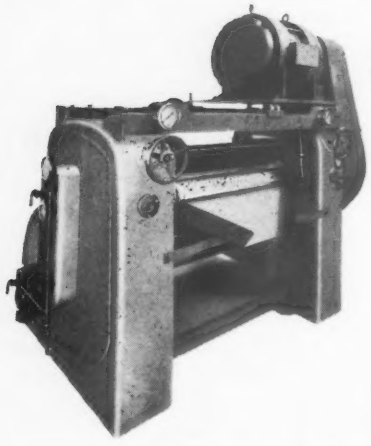

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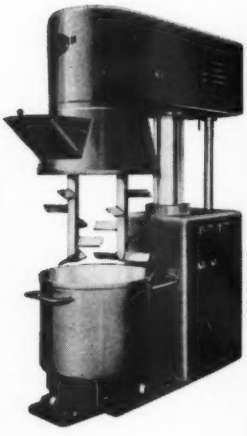

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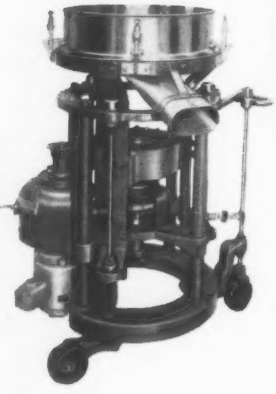

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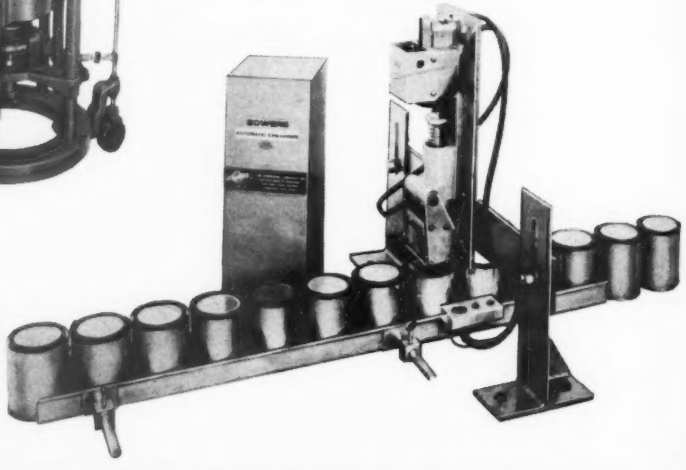

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For more information circle No. 65—last page

PRODUCTION

IMPROVEMENTS and new innovations characterized the field of production equipment during 1959.

With the trend toward faster dispersing methods, high speed equipment commanded the interests of paint production managers and superintendents. In this connection, the marketing of new dissolvers, capable of dispersing and deagglomerating, was noted within the last twelve months. Among these were a dissolver which features a unique power transmission system capable of delivering over 90% of motor horsepower to the impeller even at lowest speeds; another dissolver constructed with an oversize steel impeller shaft to provide smooth (less vibration) operation under heavy work loads; a high speed machine featuring a specially designed multiple action impeller or millhead which is said to mix, disperse, dissolve, emulsify, and deagglomerate most liquids, paste or heavy paste materials.

New equipment offered to the paint industry during 1959 included: a planetary mixing and kneading machine used to process a wide range of materials highly fluid, viscous or pasty in consistency; dispersion mills with increased stone sizes and peripheral speeds said to give a 30-35% gain in capacity over former models; high speed mixers constructed with a blade claimed to be non-clogging and of turbine bucket design; a line of mass and paste mixers reported to embody several improvements in design and construction which assure long service under severe operating conditions, freedom from contamination, and a minimum of maintenance and lubrication.

Last year saw the introduction of a new filter cartridge claimed to assure true micron precision in paint manufacture. Space savings for new or revised installation and high solids capacity is another feature of this filter. Filtering action takes place through the media bed. It makes full use of "edgewise filtration." The cartridge consists of an aluminum core and viscose fiber filter media.

A new development in the design and construction of automatic batching equipment was announced in 1959. Incorporating a new formula control component, this system provides instant formula changing while completely eliminating any human error sometimes present in manual ingredient dealing systems. Each standard component is a self-contained formula, which provides complete preset control for up to ten ingredients per formula. No special operating skill is required to adjust or operate the component and the new batching control system.

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COLOR GUARD is but one in a series of paint can developments by Canco. Call your Canco representative soon and let him tell you about the many sales-making advantages of Canco paint containers.

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For more information circle No. 66—last page

Operation and Maintenance

Paint Manufacture carries a review of recent literature on paint plants and equipment.[1]

Hazards in paint factories are the subject of a paper by Broadhurst; he discusses mechanical dangers, risks of toxicity, and fire perils.[2]

A very detailed article in the *Official Digest* deals with incentive systems for the paint industry. An investigation undertaken by a Subcommittee of the New York Paint and Varnish Production Club studied various systems that might be applied to the industry, in an attempt to meet the challenge of increasing costs and shrinkage of profits. Conclusion of the group is that incentive systems are applicable to the paint industry; several successful types are outlined, and problems of administration are reviewed. This highly enlightening article discusses wage incentives, cost reduction, profit-sharing incentives, and general improvement incentives, including, among others, the Rucker plan, the Scanlon plan, and the Lincoln Electric plan.[3]

In a French source Rousset describes techniques and equipment used for filtering, thickening and centrifuging in the paint and varnish industry.[30a]

Control of atmospheric emulsions from paint and varnish operations is the subject of a two-part article in PAINT AND VARNISH PRODUCTION (Sternberg). The toxicity and other objectionable properties of materials employed in manufacturing paints are reviewed, and tables of ingredients, odor threshold concentrations are given. In his second paper, Sternberg deals with maintenance problems and procedures for fume disposal: incineration, catalytic combustion, tall stack dispersal, adsorption.[4]

Shatkin writes about depreciation, deterioration, and obsolescence, discoursing generally on problems of the aging and replacement of equipment, with special reference to the paint industry.[5]

Dunn and Zuckerman summarize some of the problems encountered in the protective and decorative coatings fields, with reference to toxicity of materials

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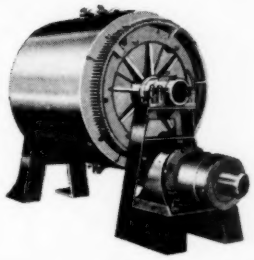

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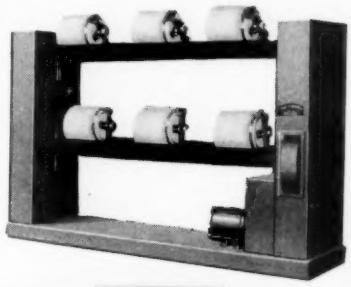

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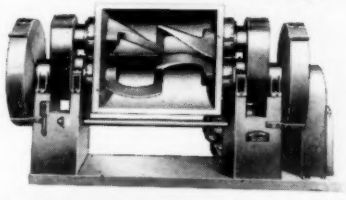

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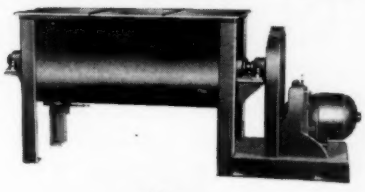

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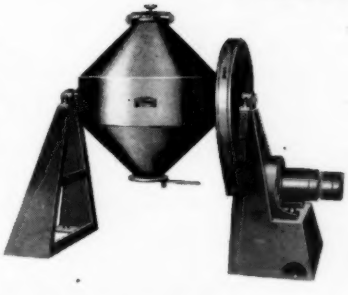

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employed. Legislation pertinent to this subject is cited.[5a]

Patents

A patent issued to Huff describes a fiberboard package for paint.[5b]

Materials Handling

In PAINT AND VARNISH PRODUCTION Scala discusses the pumping of liquid, emphasizing that the wide range of viscosities of materials used in the paint industry requires an extensive variety of pumping equipment. Some of the problems of using this equipment are considered by the author; a valuable table shows pipe sizes for handling liquids of various viscosities.[6]

Powered floor equipment is the subject of a paper by Chester; this contains much practical material about types of equipment and operation.[7]

Hoists and overhead equipment are the subject of an article by Andree; his remarks should be helpful in choosing the proper equipment for a specific purpose.[8] Fritzsche discusses conveyors, reviewing the function and operation of various types.[9] Hand equipment is discussed by Rudy.[10]

An article by Knudsen reviews effective materials handling systems for paint plants.[10a] More specifically, Rousset describes presses, extractors, macerators and diffusers (his emphasis is upon French equipment).[10b]

Problems of warehousing are reviewed by Chase, in a paper dealing with physical features, factors of conveying, palletizing, order selection, shipping, etc.[11]

Pigment Dispersion

A panel on pigment dispersion, in five brief parts, appeared in the January, 1959, issue of *Official Digest*. Purcell discusses the Cowles impeller, and suggests how it may be used most effectively; the author makes the point that, working under recommended conditions, this impeller is capable of

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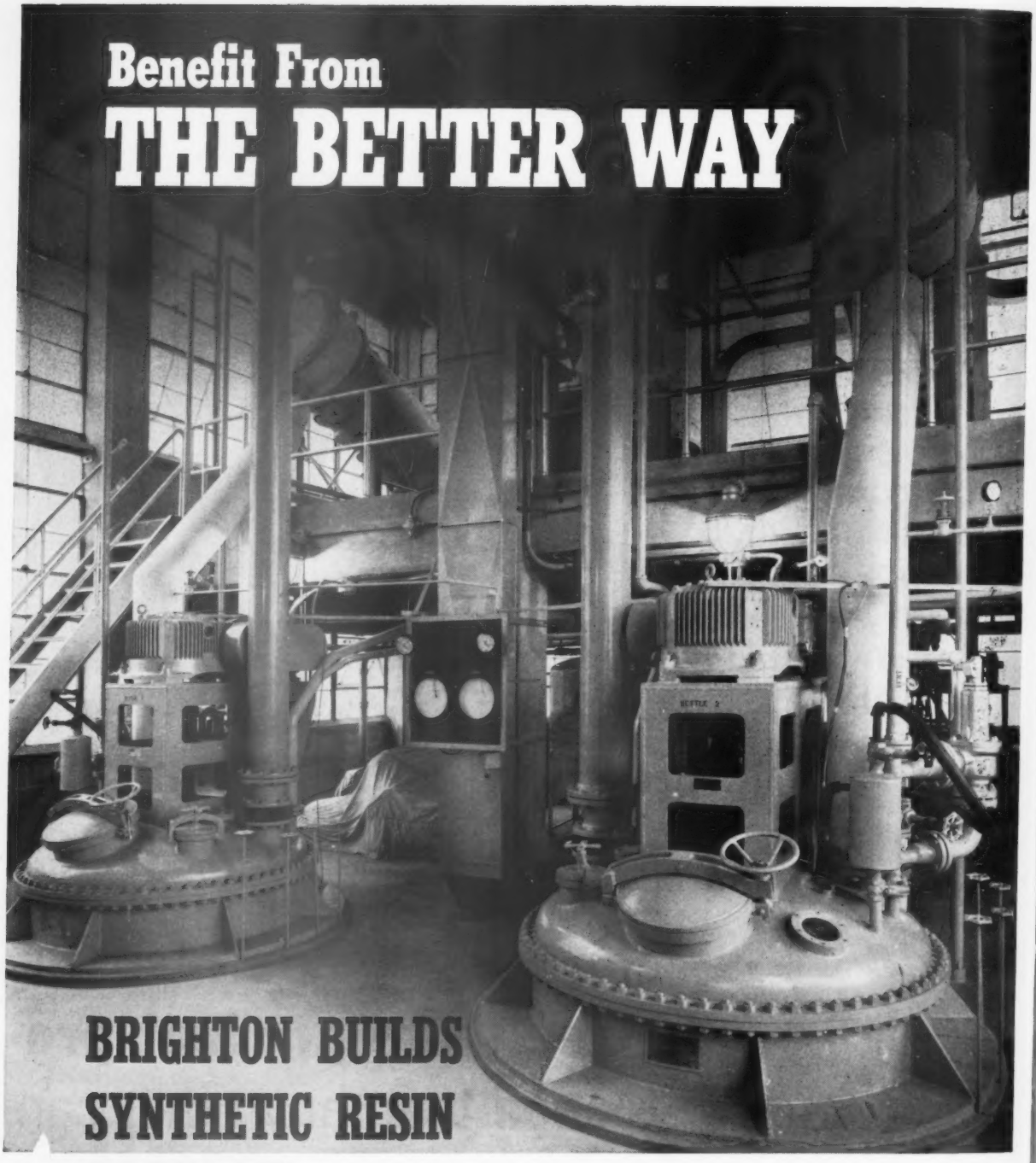

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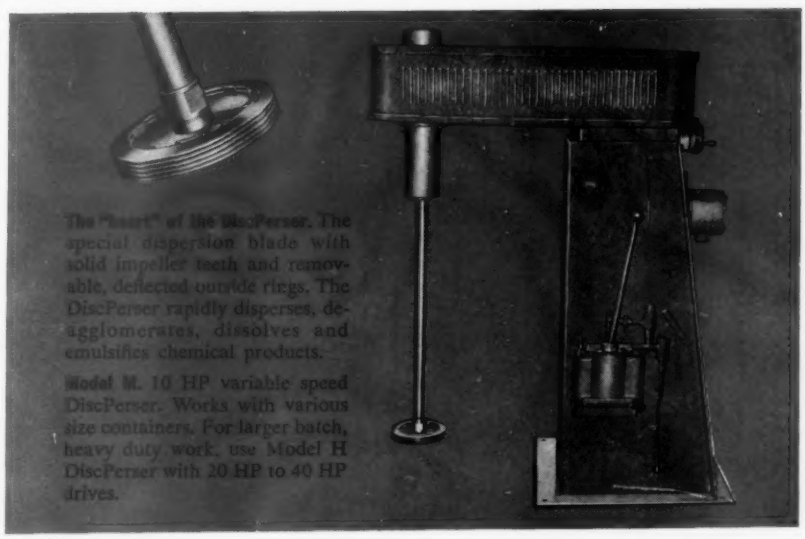
generating forces great enough to accomplish ultimate dispersion of pigments. Another high velocity machine, the Kady mill, is described by Kew. The author reports the advantages and application of the three basic models, ranging from a mill rate (based on titanium dioxide) of 150 gallons per hour to 600 gallons per hour. The mill is a batch type unit which requires no pre-mixing equipment and needs only the same finishing and storage tankage as other milling equipment; no other auxiliary equipment is required. Dispersion by positive hydraulic shear (the roller mill) is discussed by Muller; after describing the equipment, he emphasizes that present development is being directed towards higher operating speeds, greater cooling efficiency, aind simplified control. Quackenbush devotes a paper to factors of dispersion by fine media through hydraulic action, specifically the Sand Grinder. Process-wise, this grinder is said to differ basically from any other method discussed in the panel: operation does not depend on shear action of the vehicle phase, or upon cavitation effect, or upon impact of the media. Closely packed sand media operates in the same manner as a hydraulic jack: the hydraulic driving force transmitted from a rotor to a fluid is collected by sand particles in the 700 micron range and impressed upon much smaller pigment particles. Next part of the panel (Garlick) deals with dispersion by pressure attrition and impact with large media (the ball mill). Ball mill action, as the author notes, has been described as a "combination of pressure, attrition, and impact." Of these three, impact of one media against another contributes more to the end results than any other single factor. Garlick discusses the operation and advantages of both ball and pebble mills.[12]

An article in the *Official Digest* for November, 1959, deals with pigment dispersion in the Szegvari Attritor. Rutile titanium dioxide, medium chrome yellow, ferrite yellow, and lampblack were dispersed in a short oil soya alkyd; results are said to prove the Attritor an excellent means of rapid dispersion.[13]

An article by China briefly describes the types and uses of colloid mills useful in paint manufacture. Mills with small stones revolving at high speeds are said to have possible uses in the preparation of emulsion paints, and for incorporating the more finely ground and more readily dispersable pigments now available.[14]

A discussion of the latest developments in dispersion equipment appears in PAINT AND VARNISH PRODUCTION. Ball and pebble mills are described by Garlick; roller mill operation, the Morehouse mill, and the Cowles dissolver are considered; Quackenbush discusses the Sand Grinder; and Rees reviews developments in the colloid mill and sub-micron disperser field.[15]

Conklin devotes a paper to the dispersion and reduction of heavy pastes and chips. He divides the blending operation into four steps: preparation of a concentrated pigment dispersion in a minimum of vehicle, solution of remaining blender components to give viscosity approximately equal to the dispersion, blending of these first two steps, and addition of solvent necessary to achieve required coating viscosity. All four of these



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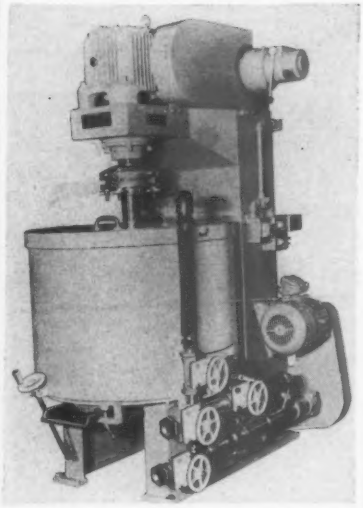

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For more information cricle No. 73—last page

steps he then describes in some detail.[15a]

Gorska devotes a paper to experiments on the dispersion of pigments by ultrasonics; Green B, Phthalocyanine Blue B, and Carbon Black, in water and in water with addition of Turkey Red and Eriphor A, EW or O, were studied. An ultrasonic generator of 500 kc. sec. frequency was employed. Under certain conditions, dispersion of all but Carbon Black was obtained.[16]

An article by Jones deals with the advantages of ultrasonic mixing pigments.[17]

Patents

United States patent 2,885,298 concerns a process said to eliminate conventional milling of soluble constituents into paint vehicles, and to be adaptable to batch or continuous operations.[18]

Resin Manufacture

An article in PAINT AND VARNISH PRODUCTION for July, 1959, deals with the properties of Dowtherm A; this compound is used in vapor or liquid processes. It is said to provide fraction-of-a-degree temperature control, uniformity of temperature, low pressures, and high rates of heat transfer in equipment.[19]

Mitchell details a technique for resin manufacture by induction heating.[20]

A direct fire system for heat transfer, in use at the Foy Paint Company, is described in PAINT AND VARNISH PRODUCTION. The system for cooking varnishes and synthetic resins uses modern gas-fired unit of 1000 gallon capacity.[21]

Color Control and Matching

A detailed article in the *Official Official Digest* reviews customary laboratory techniques for color control in production. Standards are dealt with; a series of tables illustrates color standards and changes calculated by two different methods, the Color Eye and the Colormaster Differential. A section on control of wet standards follows; preparation of panels for testing is then discussed. The paper concludes with a review of problems of acceleration matching a batch to standard checking methods.[22]

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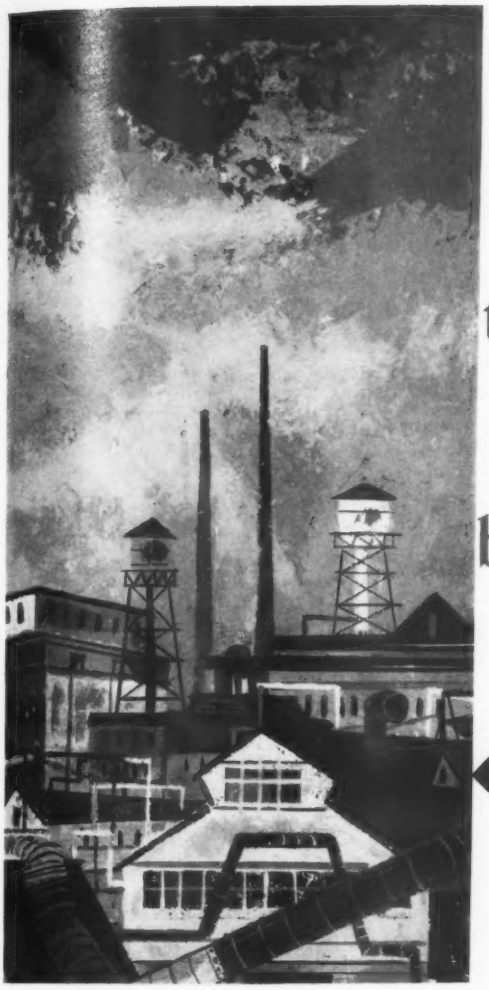

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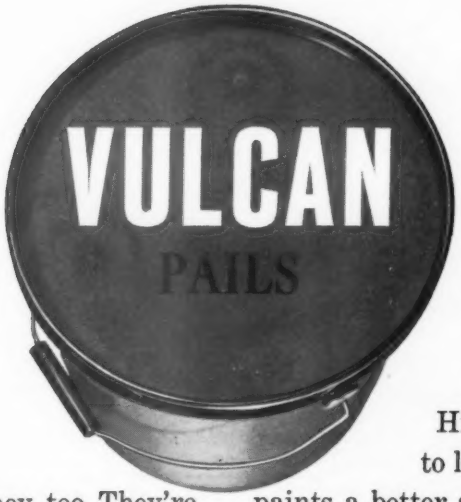

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COATINGS CORROSION APPLICATION

THE USE of latex paints for exterior wood application appears to be making inroads on the traditional oil-base house paints. These paints which will be marketed in the spring of this year appeal especially to the home owner because of their easy application and clean-up properties. However, one of the perplexing problems connected with these paints is to have the user follow directions implicitly in order to avoid disappointing results. Companies who offer such paints have gone to great lengths in impressing upon the user of the importance of proper application techniques.

Besides easy application properties, these paints are claimed to have the following advantages over conventional oil-based paints: better resistance to ultraviolet light, non blistering and quick-drying. Some of the disadvantages are: they cannot be applied in temperatures below 40 deg. F.; many manufacturers recommend that an oil base primer be used over bare wood, and previously painted surfaces which are chalky; in certain cases staining is a problem, particularly with cedar and redwood.

Fire retardant coatings have attracted considerable attention in recent months. About a year ago, such a coating was marketed which was classified as fire retardant in the Underwriters Laboratories Fire Protection Equipment List. In addition, this paint passed the Navy's thermoelectric test which show that it retards the progress of flames through a bulkhead.

There are two types of fire retardant paints in use today. One is an intumescent type which has a film thickness similar to conventional paints. The fire-retardant properties of intrumescent paints depend on their ability to bubble, foam or swell. This swelling effect provides an insulating layer under the influence of heat. The other type of fire-retardant coating is the mastic type. These are thick coatings formulated without volatile solvents and are generally applied by trowelling. These paints are formulated with such materials as asbestos, Vermiculite, glass, etc. They derive their fire-retardant properties from the low thermal conductivity of these materials.

In the field of industrial coatings, emphasis has been on corrosion and rust-resistant finishes. Among these new coatings are a high zinc content primer for use in areas where salt spray and high humidity are prevalent; a steel primer is claimed to penetrate into the pores of the metal to provide increased adhesion; a high solids vinyl solution can produce a 5 mil film thickness by a hot-spray technique; and a dispersion of polytetrafluoroethylene gives in addition to good adhesion to metal substrates, high corrosion resistance.

A new "dry" phosphatizing process, introduced a few months ago, will be commercially available by the middle of this year. This process links vapor degreasing in spray-in-vapor painting in a complete metal finishing system based on trichloroethylene.

In the new process, metal parts are given a phosphate coating by dipping or spraying with a trichloroethylene-based phosphatizing solution maintained at its boiling point. After phosphatizing, as the parts emerge from the trichloroethylene vapor zone, the solvent completely evaporates leaving parts dry and ready for painting.

It is claimed that this new painting system slashes costs because thinner and paint overspray are recovered and reused in the machine. Also, the use of trichloroethylene minimizes fire hazards and reduces the investment required for fire protection equipment.

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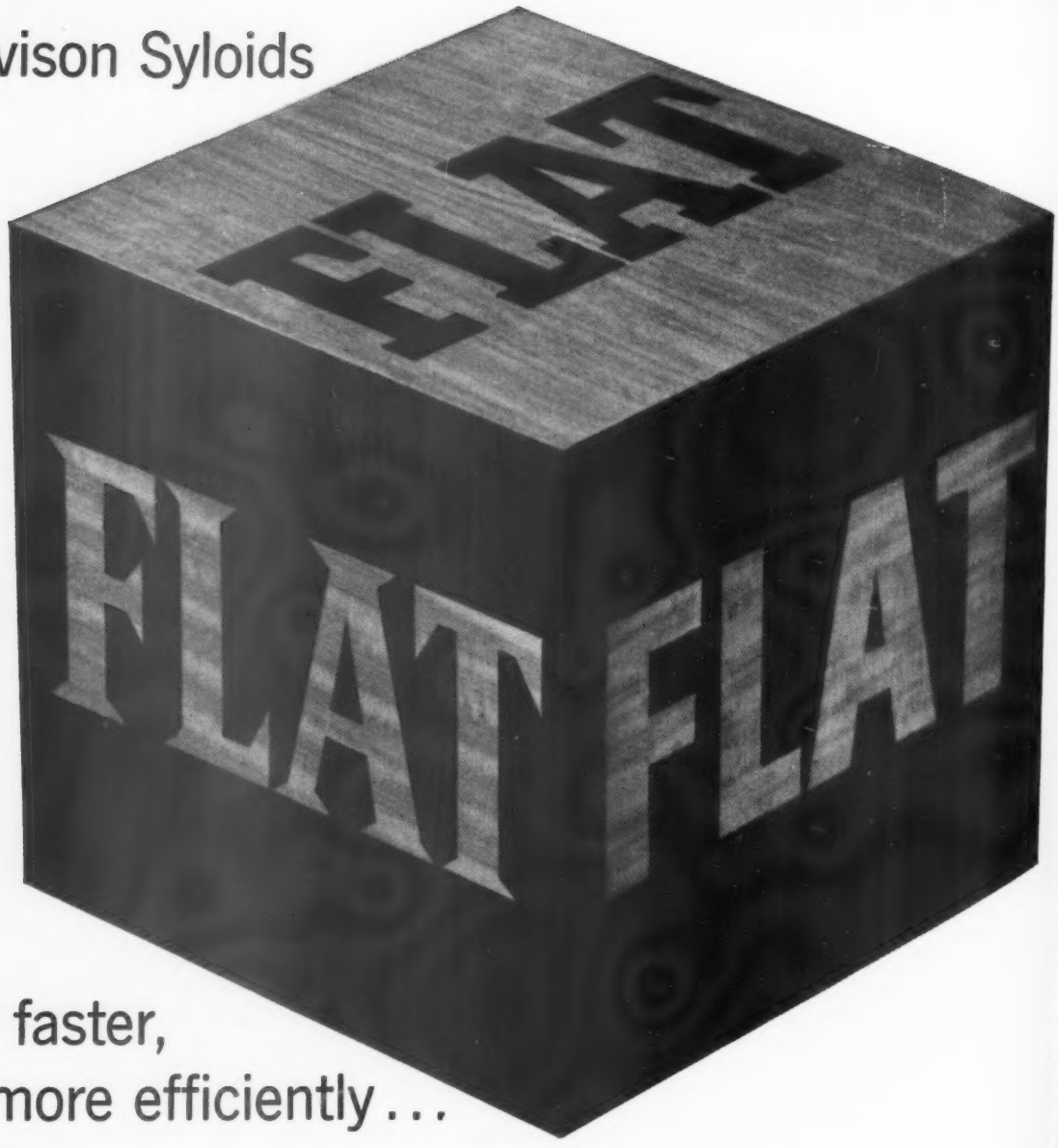

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Industrial Coatings

Glaser and Bromstead discuss modern vehicles and their properties, silicone coatings and their applications.[1] Brushwell, in another journal, reviews specialty coatings—those for printed circuits, for electronic laminates, and for conduit interiors.[2]

Standardization in the paint field, from the viewpoint of industrial paints, is subject of a paper by Apon. He details requirements for establishing a system of specifications, and notes techniques of testing. The system he describes is based on the influences to which a painted object may be exposed in practice. Mechanical and physicochemical requirements are considered, being stated only qualitatively.[3]

An article by Owen reviews American Naval requirements for paints, preservatives and coatings, with some statistics of the use of such materials.[4]

A literature review in *Paint Manufacture* (Chandler) covers insulating lacquers.[5]

Water-soluble vehicles in industrial finishes are reviewed in a paper that deals with Archer-Daniel-Midland's Arolons 1000, 304 and 110.[5a]

In an article in *Paint Journal* water thinned stoving finishes are discussed: their characteristics and advantages of using them.[5b]

The January, 1959, issue of *Official Digest* carries a panel discussion on water-thinned paints for industrial use. Covered here are water dispersed emulsions (Stickle), emulsion vehicles (Thorstad), latex paints (Carpenter), water-soluble resins (Boller), painting of automobiles (Mitchell), and acrylic emulsions (Cheetham).[6]

Water-soluble resins are discussed in *Paint Journal*. The advantages of these systems, in terms of fire and toxicity hazards, make their use desirable. Their properties and applications as industrial coatings are described.[6a]

Materials in Design Engineering carries an article on organic coatings for metal products: types of alkyds, ureas, and melamines, acrylics, bitumens, cellulosics, coumarone indenes, epoxides, fluorocarbons, phenolics, polyamides, rubbers, silicones, styrene butadienes, urethane, and vinyls are covered.[7]

Nagel discusses choice of proper vinyl coating for particular metal parts; covered in his paper are fluidized bed, plastisol, film, and solution coating methods. Nagel briefly describes all of these techniques and compares them on the basis of thickness range, thickness uniformity, edge coverance, appearance, substrate limitations and coatable substrate shapes.[7a] Destable also treats of protective coatings for metals; he reviews the formulation and properties of automotive primers based on butadiene-styrene latices.[7b] In the same area, Norum, Annonio and Schaufelberger deal with the properties, formulation and applications of organosol and plastisol coatings, going into considerable detail.[7c]

Versamids and Genamids are described by Fulmer and Glaser, particular emphasis being on the use of these General Mills products in maintenance coatings.[7d]

An article by Scheller reports on the use of aluminum pigments for industrial finishes.[7e]

Stevens devotes an article to polysulphide coatings and sealants. These compounds are interesting for their resistance to various fluids—particularly oils and solvents—and readily form the basis for new types of coatings and sealants. Some recent developments and uses are discussed in Stevens' paper.[8]

Electric insulating varnishes are reviewed by Sung and others. Phenolic-resin varnishes were made from oil-soluble phenolic resins, tung oil, linseed oil and alkyd resin; the properties are cited. Best results were obtained with five parts drying oil (tung oil 85, and linseed oil 15%), and four parts oil-soluble phenolic resin at a baking temperature of 160°C. for one hour.[9]

A brief note in *Electroplating* cities some of the difficulties in painting ductwork at the new aero-engineer altitude test plant of Rolls-Royce, Ltd. (Derby, England). In choosing special paints for some of the high and low temperatures encountered, variations in atmospheric conditions, as well as the temperature fluctuations, must be considered.[10]

In this general area of special applications, a paper in *Paint Journal* describes the development of modern aircraft finishes.[10a] A review article by Shidder deals with pipeline coatings.[10b] Polyester finishes for yachts are covered by Stupples.[10c]

The properties and advantages of bitumenous coatings are cited in an article by Alexander and Cunningham.[11]

Dybaloki, discussing cationic asphalt emulsions, details the properties of Duomeen T, Ethoduomeen T 12, T 13, T 20 and Arquad T-50, all products of Ammon Industrial Chemical Company.[11a]

Niesen writes about the testing of reactivity of lac polyester resins. He describes a calorimeter. In evaluating results obtained, the appearance of the final hardened resin is said to give an indication of its usefulness.[12]

Polyester lacquers in furniture finishing are described in a Russian source. The use of these lacquers in the Soviet Union is only beginning. GIPI-4, a new Russian polyester lacquer, is a three-component product containing paraffin and up to 95% film-forming substances. The properties of this lacquer are cited and compared with those of Russian nitrocellulose furniture-finishing lacquers, and of the English product, Creston-200. GIPI-4 takes 24 hours to dry. It is applied in two or three coats, by spraying at 2 atmospheres, or using a special apparatus to permit even application; it may be applied to horizontal surfaces only. A solution of polyester resin in styrene, diluted in acetone (1:1) is used as primer; application of the lacquer follows in 1-1½ hours.[13]

Patents

United States patent 2,853,397 covers a process of manufacturing improved organic dyestuff colored lacquers which incorporate N-substituted urethanes.[14] Protective coatings for metals, comprising phosphoric acid of 1-8 moles concentration and at least one tannin material, are patented by Shreir.[15] Shotton and Edmonds also patented coating compositions for metal surfaces; these comprise a liquid polymer in which a major amount of the polymer is formed by 1,2 addition, and polymeric material selected from the group consisting of rubbery polymers in which the

major amount of the polymer is formed by 1,4 addition.[16]

A heat hardenable lacquer composition, the essential constituents of which comprise a polyamide resin and a cellulose acetate butyrate in a solvent, is patented by Pinder.[17] United States patent 2,866,720 (to Martin and Morin) covers a method of making an ornamental protective crackle coating on the surface of an object, comprising applying a uniformly pigmented thermosetting synthetic resin enamel base coating in a volatile organic solvent; the solvent is evaporated until the resin sets in an immobile solvent-wet condition.[18]

Another decorative and protective coating (for iron) is patented by Quigley and Walters. This coating consists of an aqueous acidic (pH 2-5) latex composition in which the binder consists of colloidally dispersed particles of a polymer of an aliphatic conjugated diolefin. Good resistance to mineral spirits and water is claimed for the film.[19]

Strzyewski and Geilenkirchen patented adherent coatings for polyethylene; pigmented lacquers and alkyds adhere to polyethylene surfaces previously treated with chlorinated hydrocarbons and irradiated with ultraviolet light.[20]

Hammered-metal-finish compounds are subject of a patent issued to Lederman.[21]

Fast-drying metal primers were patented by Levine. These are compounds of a mixture of organic solvents with a mixture of 65-70% by weight of alkyd resin of short oil length and high acid number, 25-30% of a vinyl resin, and 5-10% of an amine resin.[22] Protective coatings patented by Bauer are said to have good adherent qualities for metals, including steel (but not copper). They are made by application of a mixture of a polyperfluoroölefin and an alkylol (or preferable etherified alkylol phenolic resin) with or without a plasticizer and an epoxy resin.[23]

A patent granted to Krajewski and Kelly covers stabilized ethylcellulose hot melt compositions, which may be applied to metal parts to form tough protective coatings that can be stripped or peeled clean from the articles.[24] A coating for polystyrene containers renders the surfaces capable of receiving pressure-sensitive labels, according to United States patent 2,880,898.[25] A patent issued to McKay covers can coating varnishes.[26]

Metal finishing systems for steel are the subject of a patent granted to Evans. These comprise an undercoat or primer of baked epoxyhydroxy polyether resin esterified with 1-7.5% by weight of resin, of a phosphoric acid, and a dried methyl methacrylate-lacquer topcoat.[27]

Wooding patented a pheral coating with nitrogen resin primer; this relates to anchor coating or pretreatment of substrate material.[28]

Alkali-resistant coating compositions were patented by Teeter, Schneider and Gast.[29]

A method of preparing lacquer from resin was patented by Niszczinski; the rosin, heated to 180°C., is subjected to the passage of water vapor for one hour; after addition of about 4% zinc oxide, or carbon monoxide, the resin is again heated at the same temperature until it becomes transparent. On cooling to 150°C., 10-15% polymerized fish or dying oil is added, and the mixture is kept at this temperature for an additional half-hour. At 95°C., 10-15% turpentine, water and emulsifier are added. Lacquer forms hard and elastic films.[30] A lacquer for coating tin plates was patented by Grosman and others; this is a tung-oil modified condensation (in

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alkali medium) product of a mixture of phenols with formaldehyde, esterified with butanol, and diluted inorganic solvents.[31]

Aqueous baking lacquers were patented by Hönel.[32]

A patent issued to Staicopoulos covers methacrylate copolymer resins and films made from them; the resulting topcoats are hard, smooth, glossy, and resistant to solvent cracking and weathering.[33]

Glaser patented thermosetting protective coatings.[34]

United States patent 2,882,251 (Christenson) deals with interpolymers of vinyl halides, ethylenically unsaturated esters, and glycidyl polyethers; these are described as suitable as air- or bake-drying coating resins (in xylene or toluene).[35] A patent issued to Hessel and Robinson relates to a cross-linked copolymeric polyester; the polyester is prepared in, and cast from, an aqueous mixture. After baking, it is water-and heat-resistant, and adheres well.[36] Rickert patented aqueous coating compositions from coal acids and starch; the starches may be potato, wheat or corn. They form bases suitable for coating on glass, plastic and aluminum.[37]

A patent granted to Sample and Williams deals with modified alkyd resins reacted with a vinyl aromatic compound, a vinyl cyanide, and an acrylate.[38] Primers for vinyl chloride resin coatings were patented by Brown and McKnight; these are blends of a polyurethane resin and a vinyl chloride-vinyl ester-maleic acid and/or anhydride copolymer. As primer coatings they are adherent, non-soluble in ester-type plasticizers; vinyl resin coatings adhere to them.[39]

Antistatic polymeric coatings are protected by United States patent 2,891,878.[40] Machlin patented polytetrafluoroethylene coatings, useful in magnet-wire insulation, coatings for automobile mufflers, etc.[41] Reduced polymethacrolein coating compositions are covered in a patent issued to Chapin and Longley.[42] Stable polyethylene coating dispersions containing no emulsifier are the subject of United States patent 2,898,233.[43] Hannah patented a stripping resin paint.[44]

Wilms, Bayer and Bunge patented a lacquer containing an organic polyisocyanate.[45] Nitrocellulose lacquers were patented by E. I. du Pont de Nemours & Company: these lacquers are rendered more durable by addition of a copolymer of 20-60 parts butyl methacrylate and 80-40 parts alkyd resin which contains 40-55% coconut oil, 1-8% maleic anhydride, and 0.4-10.2% by weight of unesterified glycerol OH groups.[46]

Cottonseed oil-based coating compositions were patented by Siddiqui and Aslam; these are tack-free films produced from cottonseed by cooking it with rosin and metallic oxides: 0.5-1.25% lead oxide and 0.33-0.76% manganese dioxide. Resulting films were found comparable in scratch and water resistance to linseed oil-varnish films.[47]

A Russian patent covers alkoxysilane copolymers with diethyl terephthalate; the resulting products are described as suitable for lacquers.[48] Another Russian patent deals with a paint primer for ferrous and nonferrous metals. This

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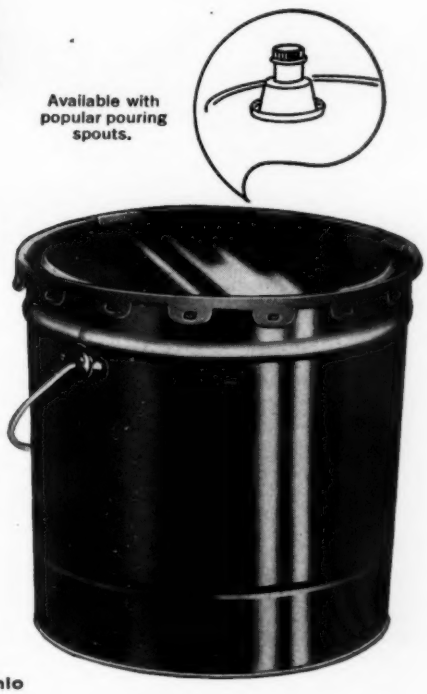

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is a composition containing a copolymer of butyl methacrylate and methacrylic acid 1.0, abietic resin 0.3, tritolyl phosphate 0.1, zinc yellow 0.6, titanium white 0.2, and talc 0.5 parts by weight. Volatile components comprise butyl acetate 50, benzene or toluene 20, butyl alcohol 20, and ethanol 10%.[49]

Japanese patent 2146 (1959) covers a paint vehicle; oil obtained from the shell of *Anacardium occidentale* is heated with fatty acid ester of epoxy resin, phenol, cresol and hexamethylenetramine. The product is dissolved in a solvent consisting of mineral spirit and solvent naphtha, and cobalt naphthenate is added to give a paint.[50] Japanese patent 2147, to the same patentee, deals with alkyd resin, prepared from glycerol, linnen oil fatty acid and phenol anhydride; used instead of the epoxy resin of the previous patent.[51]

Another Japanese patent covers a lacquer paint drying at room temperature.[52] Funeyama, Horiguchi and Nakanishi patented a heat-resistant paint. In their process, equivalent amounts of vinyl acetate monomer and the urethane monomer are reflexed in ethyl acetate in the presence of benzoyl peroxide. The resulting polymer is treated with tritolylphosphate and diluted with toluene to give 50% clear varnish. The varnish is mixed with Cu_2Hg_{14} and a mixture of toluene and AcOEt to give heat-resistant paint.[53] Ohmori and Kageyama patented an aqueous coating material.[54]

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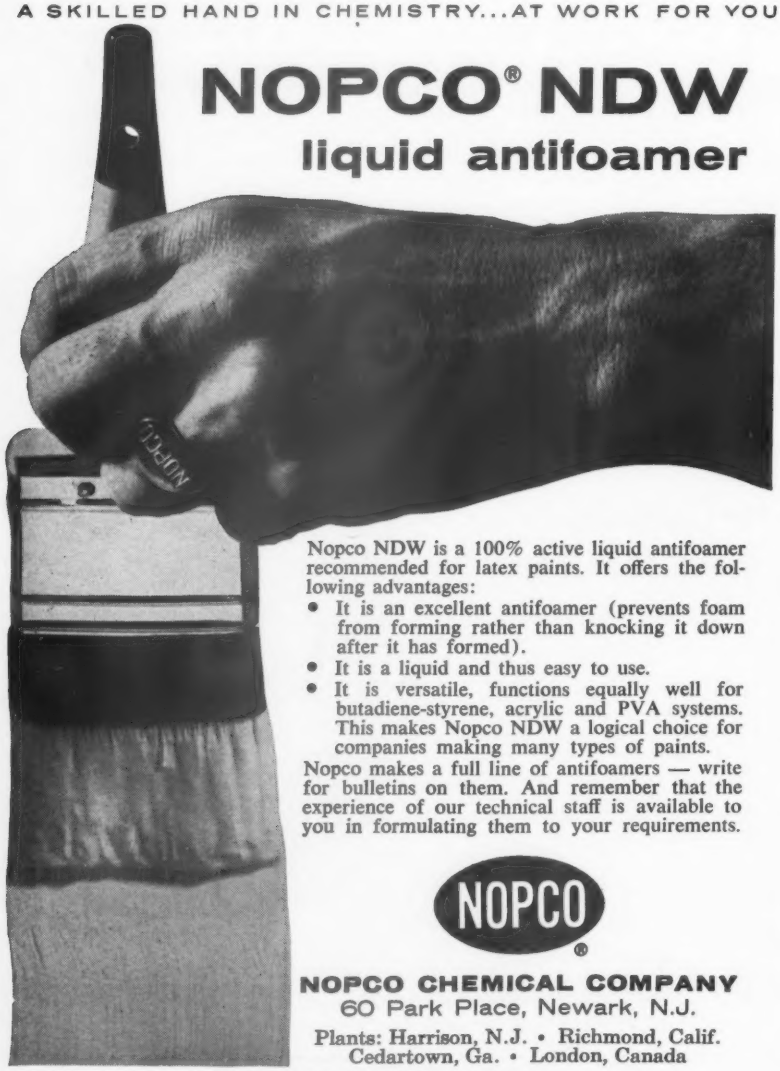

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Architectural Coatings

In a review article in PAINT AND VARNISH PRODUCTION, Hensley and Layman describe alkyd emulsions for architectural finishes. They discuss the properties of such paints, pigmentation, formulation, application problems, and advantages of production.[1]

Paint Industry carried an "architectural coatings forum." This was devoted to a discussion of the relative properties, in specific end uses, of a number of products. Thirteen experts, associated with different manufacturers, dealt with such subjects as polyvinyl acetate emulsions in interior primers, alkyd based interior flat primers, water-reducible resins in interior finishes, etc.[1a]

The exposure of exterior house paints is subject of a paper by Southard. The method he describes is that used by the Pigments Department of the du Pont Company; his article covers factors of formulation, selection of panels, application of paint, exposure of the panels, and reading and recording of results obtained in tests.[2]

Physical and chemical preparation of yellow pine surfaces are discussed in the *Official Digest.* Extensive panel exposure tests are taken to verify previous conclusion that edge grain yellow pine offers a much better paintable surface than flat grain boards.[3]

Kapse and Patwardhan devote a paper to weathering studies of house paints; commercial house paints were exposed on steel panels in April, July, and November. Paint exposed in July (i. e., before the rainy season in India, where the tests were made) were observed to deteriorate most rapidly.[4]

The influence of humidity on wood and paint coatings is discussed by van Loon. Dealing with "reliefs" and blisters on wood and on coatings applied to wood, this author found that formation of reliefs appeared to be a function of change of moisture content, so that paint layers applied on wood follow the changes of surface, and lose their smoothness. Blistering may also occur (but not always); its appearance depends on the properties of the paint system (adhesion, swelling, etc.), and of the

wood (swelling, shrinking, etc.) Prevention of reliefs and blisters is important, since they are irreversible phenomena as a rule.[5]

Allyn discusses efflorescence and chalking on painted masonry surfaces. The source of efflorescence in salts, the chalking of paint films, and ways of increasing resistance to these changes are considered in his paper. He notes that it is essential to use binders and pigments with maximum resistance to alkali, moisture, heat, and ultraviolet light. In addition, maximum stability must be provided, both for pigment dispersion and for emulsion vehicle to resist coagulation by soluble salts during application.[6]

The use of platy wet-ground mica in fire-retardant paints was reviewed by Kronstein, Castronovo and Cordones. Their article describes results of a study of the use of platy pigment of particle-size diamater—which would open up some additional forms of sealer to the paint market—and of the employment of a chemical surface modification of platy 325-mesh wet-ground mica, which would increase the density of paint films and might give a fire retardant effect beyond the platy-shaped material itself. Interior and exterior fire-retardant paints were tested, two of these using isano oil instead of linseed oil, and some using wet-ground mica. Results indicated that both the 325-mesh mica and the isano oil contribute to a decrease in burning rate of the paints tested.[7]

Fire-retardant paints were the subject of a panel discussion published in *Official Digest*. Six experts informally consider fire loss, fire retardant coatings for military use, and the testing of such coatings.[8]

An article by Lundy deals with fire-retardant paints: their composition, evaluation, and performance as these pertain to the British Thermal Insulation Act.[8a]

Some of the particulars of color and its perception, and color codes for safety in industrial plants and installations (for example, on piping and machinery) are discussed in an article by Seminara.[9]

A two-part review of recent discoveries and improvements in colors for coatings appeared in *Paint Technology*. This covered phthalocyanines for paints and inks, vapor-phase titania, red and green pigment dyestuffs, carbon black, and silica dispersed colors.[9a] Along the same lines, Hibbard discussed colored emulsion paints for exterior use, with particular reference to chemical fading and fading by chalking; the experiments he describes suggest that fading by chalking is actually fading of the colored pigment, caused by destructive oxidation.[9b]

An interesting paper by Ousebey reminds us that lining is still employed as a paint finishing method—a "minor form" of decorative art still practiced in certain industries. This article describes the kind of paint used, and the techniques and apparatus for application.[10]

Traffic Paints

A paper in *Official Digest* deals with durable traffic paints having a fast dry time. These products are modified with Parlon chlorinated rubber. Vehicle variables included type of varnish, type of alkyd, viscosity grade of Parlon, and pigment volume concentration. Pigment composition was identical in all the paints.[10a]

Another article in *Official Digest* reports results of road tests and laboratory abrasion of traffic paints. Twenty types of paints were tested on concrete and asphaltic concrete roads. A new type of abrasion machine was tried out. Results

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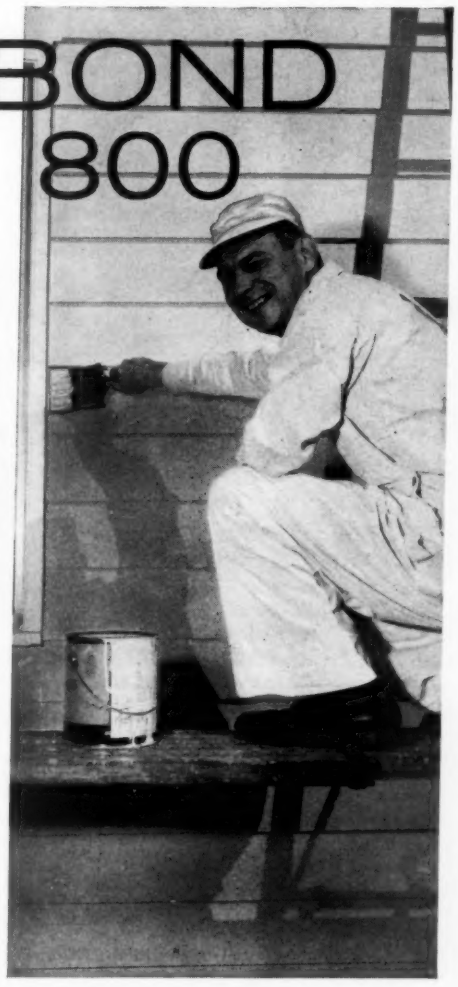

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obtained showed considerable lack of agreement; it is recommended that a study be made of the factors which affect the durability of traffic paints. It is believed, for example, that method of application is a very important factor.[10b]

Patents

United States patent 2,881,088 covers a fire-retardant composition comprising a mixture of 50-80 parts by weight of a foam-forming component, 10-50 parts by weight of a carbon-forming component, and 3-50 parts by weight of a synthetic resin; the patent includes a method of protecting an article against fire by application of a solution containing these components.[11]

A patent issued to E. C. Scholl covers water-dispersible texture paints; these are prepared as water-dispersible dry powders by using a cellulose ether containing 55% active cellulose and soybean meal as binder. Talc and mica are used as bodying agents. The resultant paints are stable on storage; readily applied, they cover and adhere well. Typical formulations are given.[12]

United States patent 2,885,380 deals with a flame-resistant composition.[13]

A patent granted to Moore covers a cold-water paint.[14] Schuetz and Ericson patented a fire-retarding roof coating.[15] Resinous waterproof coatings for plaster, concrete and similar surfaces were patented by Uraneck and Sonnenfeld.[16] In the same area of application, Heijmer patented aqueous coating compounds for concrete; in the method described here, crushed marble, glass or quartz is added to a coating previously patented (United States patent 2,700,615, dated 1955); pigment or stain may be added.[17]

An Indian patent covers a fire-retardant, heat-insulating paint. This is prepared by mixing sodium silicate and/or potassium silicate with 15% by weight of cashew-nutshell liquid and/or Bhiliwan-nutshell liquid. To this mixture other fire-retardant materials, such as asbestos, borax, vermiculite, can be added.[18]

United States patent 2,865,266 deals with a highway marking paint; this is a reflective coating containing a reflective pigment.[18a] Kullenberg patented a paint for highway making; this comprised a ready-mixed reflectorized paint incorporating glass beads.[19] A patent to Shuger covers reflective highway-marking paints. These are made without an appreciable amount of solvent or evaporative vehicle by incorporating a pigment, catalyst and reflective material in a liquid mixture of a polyester resin and a copolymerizable vinylidene monomer; another patent to Shuger covers mixtures of alkyd and epoxy resins, claimed as vehicles.[20,21]

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Corrosion

General

Figures cited by Tator show that mill scale on many fabricated surfaces may well cost over one billion dollars annually in the United States alone. How the scale acts, and how to prevent it, are discussed at some length in Tator's article.[1]

A review by Scofield covers recent developments in the field of protective coatings; 70 references are cited.[1a] In the same field, Krenkler discusses the latest developments in antirust paint. The effect of environmental factors (rain, dew, etc.) on the efficiency of rust removers and primers is reviewed in some detail. The composition of protective paints, pigments, and binders for priming and for topcoats is considered; particular properties of pigments, fillers, and binders are dealt with.[1b]

High build epoxy resin maintenance finishes are the subject of a paper by Somerville; these are

materials that can give multiple-coat film thickness in one application.[1c]

PAINT AND VARNISH PRODUCTION describes a Swedish anti-corrosive paint system for maintenance applications. Two coats—a primer and a top-coat—are said to give as much protection as four ordinary coats. Made by AB Wilh. Becker, Stockholm, the product discussed is called "Plombmonja," a red lead which will produce a dry thickness of 3-4 mils without sagging, on one application.[2]

Preparatory treatments for protective coatings are dealt with in a two-part article in *Corrosion Prevention and Control*. The first part discusses derusting and descaling procedures; the second part is concerned with degreasing and pickling techniques.[3]

The same magazine[4] describes an anticorrosive paint manufactured by Croda, Ltd; this is "Lanolac," useful also as an anti-fungicidal compound. "Telcothene," developed by The Telegraph Construction and Maintenance Co., Ltd., Kent (England) is discussed in another journal: a finely divided polyethylene which can be used to produce smooth impervious coatings on metallic surfaces, it is said to be attractive in appearance, to impart long-lasting resistance to corrosion, and to have electrical insulating properties of high order.[5]

An article by Stephenson describes development of a thick paint technique for severe exposure conditions; the method discussed is said to have made possible an 80% savings for Standard Oil Comapny of California in installations where severe outdoor conditions are encountered. Technique consists of a two-coat system totaling 10-15 mils dry thickness. Results from seven years of use on both steel and concrete surfaces are cited.[5a]

Pedlow devotes a paper to recent developments in the application of polyvinyl chloride plastisols.[5b]

New formulations said to lend versatility to methacrylate coatings are reported by Goodman; the production of more stable isocyanates, eliminating two-package system and reducing water-reactivity, has resulted in wider use of the coatings.[5c]

Maier, Cook and MacQueen discuss oil refining applications of thick-film synthetic coatings.[5d] In the same area, Garner, in an article devoted to high temperature, high pressure testing of organic coatings for oil and gas well tubing, points out that coatings should be tested under actual conditions of use. He reports the results of testing in water and mud at pressures up to 5000 lb. sq. in. and 350°F. Best coatings were found to be phenol-formaldehyde, epoxy-modified phenolic and phenol-formaldehyde with epoxy-modified overlay.[5e]

Partridge considers the use of plastics and synthetic elastomers for underground coatings.[6] For protection of chemical instruments, the use of Neoprenes is detailed by Tixier. He explains the procedures for coating such equipment with prevulcanized Neoprene plates, and cites a number of cases in which the treatment is claimed to have given satisfactory results.[7]

Three articles deal with the properties and characteristics of Neoprene. Blackburn writes about spray- and brush-applied Neoprene coatings; Blum discusses liquid and sheet Neoprene, caulking compounds, putties and adhesives, and some of their applications; and Burkitt discusses generally the advantages and uses of these elastomers.[7a,7b,7c]

Use of corrosion inhibitors in paints is mentioned in two articles. The first, by Karelina and Sushkov, is an informal report of the work on such inhibitors carried out in several USSR agencies agencies during 1957-1958. Tabulated results show the effectiveness of an ammonia-benzoic acid composition (AMBA) in solutions (e. g. gasolene) for the protection of metallic surfaces.[8] The second article, by Pawlikowski and Pollo, deals with calcium cyanamide as an inhibiting ingredient of bitumen paints. Two advantages are claimed for the compound: good inhibiting effect, and low cost.[9]

A Russian source carries a paper on the protective action of dicyclohexylammonium nitrite—a study of the electrochemical behavior of steel (C content: 1.2%) in various solutions of the nitrite, using water

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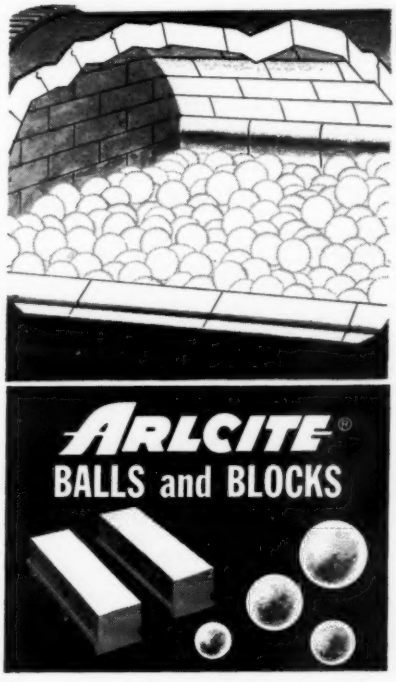

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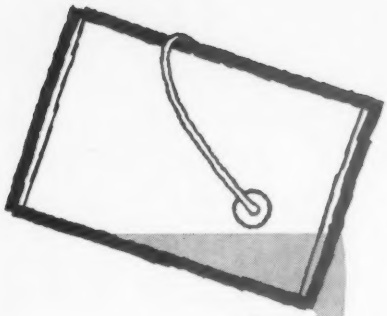

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as electrolyte, by measurement of the potentials and determination of the character of polarization. Results indicate that the protective action of the nitrite is due to the nitrite ion; the dicyclohexylamine exerts no influence on the anodic process. Similarly, it is concluded that the protective action of the inhibitor against atmospheric corrosion is also conditioned by the presence of the nitrite ion, whereas the dicyclohexylamine donates a cation which forms (with the nitrite) a volatile compound evaporating at room temperatures. It is suggested that the dicyclohexylamine may be substituted by another cation capable of forming a nitrite with sufficient vapor tension.[9a]

Wash Primers

The use of corrosion inhibiting substances in poly (vinyl acetate) metal primers is the subject of an article by Baatz. The writer points out that the presence of water in emulsion-based paints has limited their use on metal surfaces. In the experimental work he discusses, four corrosion-inhibiting pigments, all containing a chromate, and five corrosion inhibiting additives, were investigated; tests were directed primarily to determining the practicability of adding to paint itself something that might counteract the inherent affinity of the emulsion film for water. Conclusions were: that poly (vinyl acetate) emulsion systems now in use, employing conventional pigmentation such as titanium dioxide, plus extenders, achieve little or no corrosion resistance; that chromate pigments will increase resistance of the systems to corrosion; that soluble or dispersable inhibitors will increase corrosion resistance ($NaNO_2$ most effective of these); that substrate must be wetted completely; and that a high type of corrosion resistance would require an inhibitor, an inhibiting pigment, and a surface-tension depressant in the paint.[10]

Wash primer developments and properties are the subject of a review and evaluative article by Whiting.[11] Hirshfield and Allen, in a two-part series, discuss changes, in time, with wash primers. The first part of their report is a study of the possible causes of the deterioration of WP-1; a method for dissection of the primer was developed. Separation of WP-1 into fractions (accomplished for the first time in this work) is covered in the second part of the paper, and variations in chromium, phosphate and zinc ions are discussed at length.[12]

Wash primers as anti-corrosives, based on zinc chromate and chromium phosphate, are considered by Nedey. The surface of the treated metal is said to be protected by a strongly adhering microcrystalline film of a metallic phosphate; this in turn is covered with a continuous poly(vinyl butyral) film bonded to the phosphate film by a complex of chromium phosphate and poly (vinyl butyral).[13]

Epoxides

In a paper on recent applications of epoxy resins to surface protection, Zumstein discusses some recent developments covering solvent-free epoxy resin hardener systems.[14] Barakan and Wild devote an article to the subject of epoxide resins versus corrosion. Four types of epoxide are discussed: airdrying surface coatings (in the authors' experience these do not have any special advantage over alkyds or phenolics for use as structural steelwork maintenance paints); cold-setting epoxide finishes (these are said to possess many advantages and some disadvantages); epoxide coatings stoved at medium temperatures (these are useful for metal protection); and high-temperature stoving epoxides (these are useful in coating domestic appliances and for protecting the interior of collapsible tubes, etc.)[15]

Brull considers the applications of epoxy resin-based coatings in corrosive environments. He discusses epoxy two-can formulations, performance conditions, applications for specific purposes—to storage tanks, pipelines, in nuclear energy installations, in aircraft, concrete coatings. He includes mention of epoxy esters and epoxy-resin-modified alkyds.[16] Along similar lines, Dunn cites the excellent resistance of epoxy resins to atmospheric and chemical attack, their stability, and mechanical properties which make them particularly useful in anti-corrosive application.[17]

Herzberg deals with mixtures of pitches and epoxy resins as corrosion preventives.[18] The surface preparation necessary for use of epoxy resins is the subject of a paper by Naumann.[19]

Lead Pigments

Some experiences with lead pigments in corrosion resistant paints are detailed in *Paint Manufacture.* British experience with red lead and calcium plumbate is cited (ICI Paints Division offers two types of the latter). Swedish experience with a red-lead (made by AB Wilh. Becker, Stockholm), and the same firm's calcium plumbate primer are mentioned. Interesting and positive results are claimed for these lead pigments.[20]

A paper by Muirhead cites the properties of lead cyanamide, useful against corrosion.[20a]

Protection of Steel Structures

In the Soviet Union, bitumens, vinyl plastics, and particularly lacquers and enamels based on perchlorovinyl resins are widely used as protective coatings on building structures. For the anti-corrosive protection of steel, use is made of vinyl plastics, polyethylene, polyisobutylene, fluoroplastics, and such liquid polymerizing compounds as styrene, furfurol and epoxy resins. Some inorganic protective coatings now applied are described.[21]

An article by Bradley reviews types and applications of paint for structural steel.[22] Two papers in German sources deal with the same subject. The first of these considers environmental factors such as rain, dew, dew point and atmospheric attack, and their effect on priming and preliminary treatments of surfaces (for removal of scale and rust); wash primers, types of protective coatings, pigments, binders, formulation of top coats, properties of all these, and their particular functions, are also detailed. The second paper, by van Oeteren-Panhaüser, is an examination of the literature covering a number of famous iron and steel structures, showing that their useful life can be extended significantly by application of the right protective coating at proper intervals.[24]

Wallgren writes of the Swedish contribution to the protection of steel through painting. His extensive report (in two parts) details the work of the IVA Corrosion Committee, established in 1933, and now engaged in a very wide range of activity in the field of corrosion. Tests carried out by various groups within this Committee over a long period of time are discussed, including: effect of primer on the life of a paint system, influence of top-coat on painting. The second part of Wallgren's report describes new standards for pretreatment and a program for a test series based on these standards.[25]

The minimum paint film thickness for economical protection of heat-rolled steel against corrosion is the subject of a paper by Bosch. He cites preliminary results from a number of local group tests within the Paint Research Institute; since less than 10% of the test panels have been retired, however, no conclusive data can be claimed.[26]

A paper by Higgins is devoted to a stainless steel metal protective paint for corrosive areas; successful incorporation of stainless steel flakes in a practical paint for metals is claimed, and results of eight years of exposure in transmission towers of the American Electric Power System are cited. Great durability, dirt-resistance, slow rate of chalking, excellent hiding power, good brushing properties, and long life expectancy are the advantages claimed.[27]

Marpon discusses the behavior of anticorrosive paints as a function of their composition, considering in some detail the properties of paints in relation to their end purposes on iron and steel structures.[28]

According to van Eijnbergen, it is desirable, in certain instances, to paint hot-dip galvanized steel: for example, in an acid industrial atmosphere, or where contact with sea-water is expected, where parts are inaccessible and hence reached only with inconvenience, for esthetic reasons, or for reconditioning. His article briefly details surface preparation, pretreatments, and the properties of available paint systems.[29]

Zinc

A review article in PAINT AND VARNISH PRODUCTION describes the results of twenty years

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of research at Cambridge University, dealing with zinc dust paints. Work done at the University as early as 1941 by Mayne, Evans and others, is said to have paved the way for large-scale commercial development of a corrosion-inhibiting paint.[30]

The behavior of metallic zinc in paints is discussed by Schuster, with particular reference to zinc-based spray paints on iron. The corrosion-inhibiting action of these paints is shown to be dependent on the electro-chemical interaction between pigment and iron base; also important is the formation of zinc compounds, not readily soluble, that reinforce film texture. A final reinforcement is the superficial oxidation of the zinc.[31]

An article by Sagel discusses the properties of zinc paints, their applications where corrosion is a problem, the surface treatment of iron; Segal cites in detail results obtained in a series of tests using zinc paints on steel structures.[31a]

A paper by Kühn is devoted to the electrolytic conductivity of the binder in zinc-based antirust paints. Results of the tests described are taken to indicate that such conductivity does not influence the cathodic protection afforded by the paint system.[32]

Testing

Jelinek deals with the correlation of corrosion testing methods. The objectives and criteria of such tests, and various procedures of testing (including an accelerated corrosion test) are noted. Jelinek's article represents an extensive, evaluative review, based both on the technical literature and the practical experience of the author.[33]

Van Oeteren-Panhaüser writes about depth of roughness and corrosion prevention by paints, and tells how surface profile is determined by several instruments (which give different results). For good rust prevention, notes the author, at least 125 mμ thickness is required; it should exceed three times the depth of roughness. For average film thickness of 150-160, mμ, flame or fine-sand cleaning is necessary.[34]

The corrosion testing of paints with the aid of aerosols is the subject of a paper by Anders. The aerosol testing technique is derived from salt spray tests, and hence presents certain advantages in the accelerated testing of paints.[35]

Rajagopalan and Annamalai discuss the chromatographic treatment of zinc and other metals; techniques of testing are described in detail. Chromate coating gave satisfactory protection under conditions of high humidity, even at NaCl concentrations up to 3% at temperatures below 35°C. The authors conclude that the coatings would suffer rapid breakdown above this temperature.[36]

A paper by Evans deals with new instruments and techniques for ultrasonic measurements of tank ship corrosion losses. Procedures and equipment are described, sources of possible error in results, and their correction, are investigated.[37]

Marine paints

Two reviews in *Paint Manufacture* survey recent literature of anticorrosive and marine paints.[38] In the same journal, Kingcome reports procedures for raft testing of antifouling marine paints, and eval-

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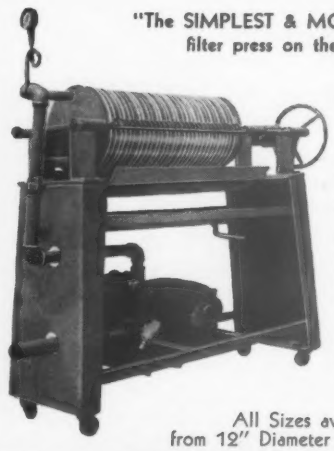

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uates the results obtained. The procedures described are those in force at the Dockyard, Portsmouth, England.[39]

A brief review of marine paints by Bradley is to be found in *American Paint Journal*;[40] a survey covering marine paints and their composition, and including surface preparation, pre-treatment, and types of finishing paints will be found in *Corrosion Prevention and Control*.[41] In the latter journal, Reynolds describes "Copon" coatings for marine corrosion control. Copon is a cold cure coating with outstanding toughness, adhesion and film properties; it is claimed that the standard 4-coat activated Copon coating, properly applied, gives years of protection.[42]

A paper by Hamilton discusses modern marine paints; it reviews the types of paint, surface preparation, methods of cleaning and application.[42a] The nature of anti-fouling paints is the subject of an article in *Paint Journal*.[42b] Vinyl resin marine paints, and aluminum paints for marine use are discussed in the same journal.[42c,42d]

The properties of inhibitors are discussed by FitzGerald, in a discussion of immersion tests of about 75 compounds, investigated on iron and steel, with results obtained by measurement of electrode potential and hydrogen absorption. Of the compounds tested, it was found that the chromates, nitrites, benzoates and dicyclohexylammonium salts are the most effective inhibitors for protection of clean steel in the presence of oxygen or water (pH being approximately neutral). Conditions under which these compounds are most effective are cited: pH of 8-9; minimum concentration; absence of halogen ions (particularly chloride).[43]

Munger devotes an article to coatings for offshore drilling structures. Seven coatings investigated in service are noted, with their properties; four composite coatings are also discussed.[44]

In a discussion of protective coatings for ships' bottoms, Brown points out that panel trials are better than service tests. Of the techniques he mentions, he finds the d-c resistance method most satisfactory.[45]

The techniques used by Esso Shipping Co. for protection of their light-oil tankers against corrosion are described by Maass and Merrick;[46] the same techniques are described by Koehler.[47]

Hochman and Roe, in a treatment of water screening tests of marine borer inhibitors, describe results of harbor tests of treated panels, during the period September, 1955—August, 1958. They note that heavy metal organic compounds, mixed with creosote, coal tar, or creosote-coal tar solutions are showing very good results against borer attack.[48]

Underwater paints, in particular for drinking-water tanks, are discussed by Sille and Damm. For protection of large iron tanks, preolite paint and Vinoflex PC-lacquer bases are recommended. The latter are better, and contain non-toxic Palatinol C (dibutyl phthalate) and Clophene 60. Application procedures are detailed.[49]

Killefer discusses the properties, requirements and applications of anti-fouling paints for ships.[50]

Patents

A liquid rust preventive composition is the subject of a patent issued to Westlund.[51] A corrosion-resistant coating was patented by Nagel-Schmidt and Rudloph.[52] A rust preventive composition is cited in a patent granted to Furey.[53]

Similarly, patents were issued to Lopata, and to Furey and Forster.[54,55]

Magnesium-zinc paint pigments, said to afford excellent corrosion resistance, were patented by Whitby[56] A Japanese patent covers a rust-preventing pigment.[57]

Mayne patented cementiferous paints; these corrosion-preventing coatings consist of an aqueous solution of an alkali metal phosphate and metallic zinc.[58]

Application

Bley discusses surface preparation techniques for protective coatings. The importance of the subject may be gaged from the fact

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that such surface preparation has been estimated to account for over 50% of the total cost of surface coating systems. Bley's article is largely devoted to sand-blasting—its techniques and the equipment used for it, since such treatment is taken to be the most economical method of preparation, wherever it can be tolerated.[1]

Two articles in *Paint Journal* are devoted to preparation of steelwork for painting.[1a-1b] In the same journal, Hamilton discusses surface preparation for paints in shipbuilding; this is a discursive article reporting some new trends and developments.[1c] Also in the same journal, Culshaw describes the preparation of steel for painting in shipbuilding. Culshaw compares methods of preparation, concluding that—while the old practice of preparing bottom plates for painting by allowing them to weather had much to recommend it—the system has now become impracticable; the best present method is to pickle or gritblast unweathered plates. Culshaw also covers problems of descaling and use of pretreatment primers.[1d]

The priming of steel is the subject of a paper by Rischbieth. He considers types of pigments used as primers, classifying them into five groups: 1) inert; 2) anodic inhibitors; 3) cathodic inhibitors; 4) anodic pigments; 5) cathodic pigments. He examines the mechanism of corrosion prevention of the pigment-vehicle system. Surface preparation and application requirements, as these affect types of priming paints needed, are discussed.[2]

Practically the entire January, 1959, issue of *Journal of the Oil and Colour Chemists' Association*, is devoted to an article, by Coleman, on the uses, chemistry, and practical performance of etching primers. The article is not only an exhaustive review, but cites results of experimental work done on certain phases of the subject. With regard to testing techniques, it is pointed out that etching primers do not lend themselves to conventional evaluation by laboratory paint-testing methods, and that testing schedules should be designed for particular requirements rather than to meet rigid performance specifications. Wherever possible, this laboratory testing should be supplemented with practical tests.[3]

An article in *Chemical and Engineering News* describes properties of the new Glidden Rustmaster primer, said to be the first new development in metal priming in many years. Special ingredient of the new primer (one-third of its vehicle) is a penetrating agent which has the effect of getting "both the vehicle and the pigment to penetrate well down into the surface of rusted metal."[4]

A paper in a Russian journal discussed Parkerizing of primers; this is a review article with thirty references.[5]

An article in *Corrosion Technology* covers cold-emulsion cleaning and its application to mass-production lines. The characteristics and uses of recent emulsifying agents, and how these reduce problems of removal of surface soils from sheet metal before painting are discussed.[6]

In the *Official Digest*, Grossman writes on the influence of cold rolled steel surfaces on paint performance and paint testing. The surface contamination encountered on steel surfaces is believed to be due to carbon, with breakdown of oils on the surface during annealing the most likely source of the carbon contamination itself. Work discussed in Grossman's paper shows that variation of carbon on lots of cold rolled steel is so great that use of such steel surfaces for testing of paint is actually undesirable. The author considers several ways of freeing steel from a carbon film.[7]

On the subject of spray painting, a paper by Niedhammer emphasizes automation, hot spraying and catalyst spraying.[8] A paper by Weed details some of the advantages of spraying with heated materials; this is claimed to give greater control of viscosity and of quality, greater plant coverage, longer film life.[9]

Powdered insulating finishes are the subject of an article by Elbling. This covers the fluidized bed process of coating objects with heavy plastic film. Advantages claimed are these: one dip gives heavy coating; sharp edges can be coated; no solvent is required. Disadvantages are cited: thin coatings are difficult to produce; smooth fluidization of powder is difficult; masking—where only a part of an article is to be coated—and holding—where all of the item is to be dipped—may be hard to achieve. Author observes also that the high electric strength obtained with the heavy coatings makes the process particularly attractive to the electrical industries. In addition, there is a considerable factor of corrosion protection.[10]

Which vinyl coating process for metal parts is discussed by Nagel. His article reviews fluidized bed, plastisol, film and solution coating methods, with a brief description of each, and a comparison of results obtained with each on the basis of thickness range, thickness uniformity, edge coverance, appearance, substrate limitations, and coatable substrate shapes.[11]

Reeves devotes an article to new British paint finishing equipment, including a semi-automatic spraying machine, conveyorized spraying and stoving units, curtain-coating machine suitable for application of cellulose, pigmented and polyester materials, and an automatic spraying machine for coating the interior of tubes.[12]

In the field of particular applications, an article by Hyde deals with a scheme developed by Westland Aircraft, Ltd., for the organic protective coating of the firm's Anti-submarine Helicopter. The system comprises two coats of stoved epoxy resin on magnesium alloy sheets, forgings and castings. The whole aircraft is finished in one further coat of epoxy primer and a finishing coat of catalyzed epoxy air-drying paint. This system is said to be superior to anything employed previously.[13] Paint systems for telecontrol systems and apparatus are discussed by Holyday. Raw material control, cleaning, priming, filling and surfacing, as these are practised by the Boreham Wood factory of Standard-Telephone and Cables, Ltd., are reviewed.[14]

Also within the field of specific treatments, *Paint Journal* describes production painting at the Crewe (England) plant of Rolls Royce, and at Vauxhall Motors.[14a-b] The "giantflow" coating system for finishing air conditioners, in use at the Louisville plant of General Electric Company, is discussed by Kinn.[14c]

A Russian writer rejects manual paint application with the brush as being too slow, and spray application as being unhealthy; he describes a new brush roller, which he claims has been successfully applied for the application of "ethinol" paints to ships' surfaces. The paint is injected on, or inside of, the roller, under pressure.[15]

Groszsteinbeck, Holtz and Tollins devote an article to results of experiments on the behavior of coating binders in the electrostatic field. Velocity, drop-size and spray angle of various binders were measured while increasing potention from 40 to 120 kvs. Various solvent mixtures were used and evaluated to compare the spray properties of binder and solvent. With natural resins, oils and oil-modified alkyds, the velocity increased with increasing voltage; most of the other resin binders showed little effect on spray properties of the solvent mixture. In general, binders do not affect the drop diameter of the solvent, but affect the spray angle at 80 kv. With increasing conductivity and dielectric constant, spray angle decreased, and spray behavior of a lacquer in the electrostatic field could be predicted.[15a]

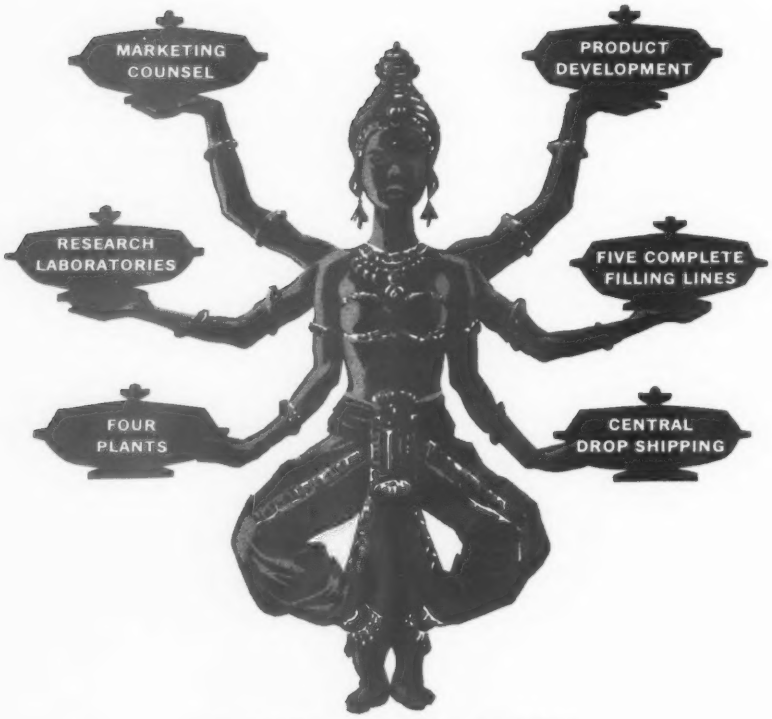
Patents

Dipner patented a process employing fluorinated polymers at low temperatures, particularly applicable in coating electric magnet wire.[16]

A patent issued to von Spulak covers a process for lacquering rubber which comprises initially treating the rubber with a solution of a poly-functional isocyanate, evaporating the solvent from the solution, applying a solution of a hydroxyl polyester (hydroxyl number 30-450; acid number 0-40), and then effecting a reaction between the isocyanate and the hydroxyl polyester.[17]

The application of self-hardening surface coating compositions is subject of a patent granted to Schweitzer and Bader. This comprises applying to the metallic (i.e., copper, zinc copper alloys and zinc alloys) surface a polymerizable coating containing at least one liquid polymerizable organic compound having a terminal $CH_2=C<$ group and a compound capable of forming a complex with copper or zinc[18] A United States patent covers a process for minimizing formation of craters in surface coatings prepared from polyepoxides.[19]

Jones patented a method of forming a phosphor coating of improved adherence on a glass surface.[20]



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AEROSOL COATINGS

IN RECENT years the field of aerosol paints has shown spectacular growth. Close to 80 million cans of aerosol paint were sold in 1959 and estimates are that by 1964 110 million cans will be sold.

Aerosol paints have come a long way since they were first introduced ten years ago. Today a wide range of paints can be packaged in the aerosol can. Among these are lacquers and enamels, wrinkle and hammertone finishes, and more recently multi-color lacquers.

Around the home, aerosol paints have found widespread use in touch-up jobs, painting toys, furniture, radiators, etc. Women, in particular, like them because there is no sloppy clean-up problems as associated with conventional painting methods.

Industrially the aerosol paint can has become a standard tool in maintenance kits and is used for touch-up purposes on machinery, gasoline pumps, soft drink dispensing machines and the like.

Special colors for industrial firms to match colors to standard equipment that may become damaged in transit or upon installation have found their way into the aerosol package. Most major manufacturers today supply aerosol paint cans with machinery, office furniture, storm windows, etc., thus eliminating an old source of customer dissatisfaction. Colors matching the latest 1960 automobile models are also available in the aerosol can.

While the aerosol can is not intended to replace quart sizes and up, estimates are that aerosols will take over all ½ pint and ¼ pint containers and 50 percent of the pint sales. In this connection, there are reports that larger cans will be available in 1960. The cans have a capacity of 24 ounces. Such cans will have to pass stringent ICC regulations which now permit cans only up to 16 ounce capacity. Developments in aluminum containers abroad have resulted in a 32 ounce size container. Domestic producers are contemplating the manufacture of such large containers here.

The formulation of an aerosol coating is basically governed by the intended use of the finished product, but there are a number of factors and peculiararities which must be taken into consideration in the final formulation filled into the container. The basic formulation must be tailored to the propellant, valve, container, and filling procedure, to assure reasonable shelf life, a satisfactory spray pattern, and a finished coating of durable quality. Generally speaking, aerosol paint formulations have a lower solids content and higher volatile content than conventional paints. Propellents make up about 45-55% of the aerosol paint formulation.

Aerosol Market

Although the volume of aerosol paints continues to rise, there has been no marked increase of literature covering the subject; this is probably due to the limited nature of the field.

A very recent article in *Chemical Week* notes that present sales of aerosol paints are about four million gallons yearly. This source estimates that, by 1963, 103,000,000 cans will be sold annually, representing about $133,000,000. These figures should be compared with trade estimates cited below.[1]

PAINT AND VARNISH PRODUCTION initiated an "Aerosol Section" with the issue of November, 1959. The first feature in this new column cited industrial analyses and forecasts by two leaders in the field, C. S. Stephens, of American Can Company, and H. D. Fine, of Plasti-Kote, Inc. According to Stephens, it is probable that by 1964, 110,000,000 cans of push-button paints will be sold. He points out that public acceptance of, and satisfaction with, the new products should mean a steadily rising market. In addition, certain technical problems have been solved, including new paint formulations and types of containers. Stephens notes that more than 100 brands of aerosol paint are now on the market. In his summary, Fine emphasizes the fact that increased leisure time, and the impetus of the do-it-yourself market, have been strong influences in the spiraling sales of aerosol paints. More optimistic than Stephens, Fine predicts a figure of 250,000,000 cans by 1965, after which date there will be a slower, but steady growth. Fine also cites the necessity for education of the public to an acceptance of aerosol paints; only 40% of buyers were aware of their existence, according to a survey conducted by Plasti-Kote, Inc. However, among those who have used the aerosol type of coating, the new method is preferred by three to one.[2]

The second issue of the "Aerosol Section" is a paper by Garton. This reviews the basic components of the pressurized paint package—the valve, propellent, container, and product concentrate. Garton cites some of the problems arising both from product and package components: the clogged valve, for example, and problems related to formulation stability. Many of these crucial issues have been solved. Garton's article goes on briefly to discuss the three basic types of coating product available: the nitrocellulose or lacquer base coating; the varnish or drying oil base coating; and the more recent water-miscible products, which provide a special vari-colored mottled or speckled finish. Among other factors cited briefly by Garton are product formulation, valves, propellents, containers, test methods, filling, marketing, and safety.[3]

In October, the Chemical Specialties Manufacturers Association held an aerosol industry clinic in New York and Chicago. Papers read covered aerosol history and marketing, principles of aerosols, propellents, containers, valves, laboratory operations. Many of these

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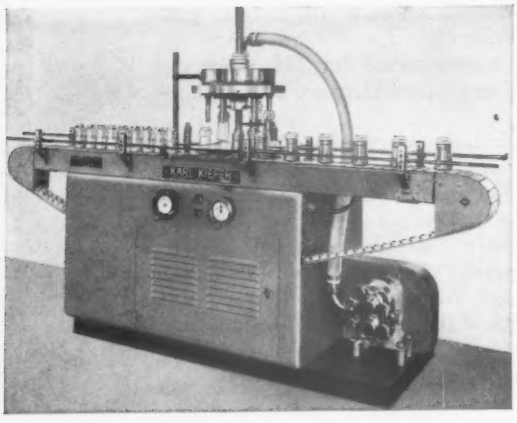

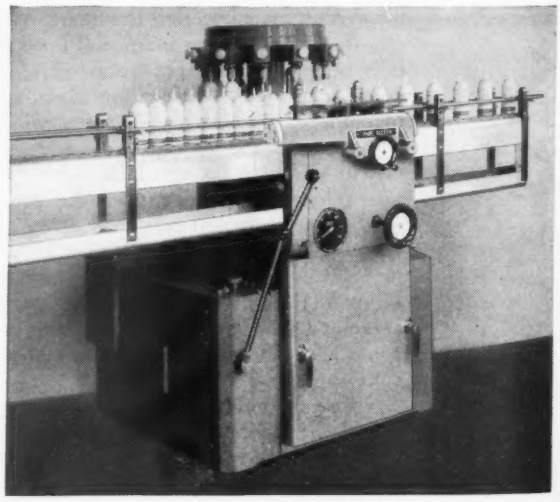

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papers will probably be published in trade sources shortly.[4]

Technology and Manufacture

PAINT AND VARNISH PRODUCTION carries a series on aerosol coating technology. In this series, Mina gives a general description of types of coatings, their properties; he also covers valves, filling processes, and formulations. According to this author, the propellent of choice for aerosol coating is the nonflammable fluorocarbon, dichlorodifluoromethane (Propellent 12), either alone or in combination with trichloromonofluoromethane (Propellent 11). He cites other compounds that have been used for particular purposes thus, methylene chloride, for example, is being utilized more and more to suppress the flammability of the overall product, and a new resin (Darasol, Diamond Alkali Company) is said to permit formulation of a completely non-flammable aerosol paint. Mina's article includes formulations for aerosol clear lacquers, a decorative spray, pigmented paints (acrylic, nitrocellulose resin and non-flammable pigmented types).[5] Mina's paper is followed by a review of the formulation of aerosol lacquers; here both acrylic and nitrocellulose types are considered in some detail. Acrylic solutions are particularly useful in metallic paints, as clear coatings to protect aluminum products, and for coating high voltage sockets, transformers, etc. The formulation of these solutions is reviewed here, with reference to solvents, modifiers and propellents. For the nitrocellulose types, it is noted that the most important factor is obtaining compatability with the propellent gas.[6] Third article in the series in PAINT AND VARNISH PRODUCTION deals with aerosol propellents: chemical properties, aerosol propellent systems, filling methods are discussed. An interesting feature of this article is a glossary of terms used in the aerosol industry; in addition, regulations applying to aerosol products are discussed.[7] An article on aerosol paint production at Plasti-Kote, Inc., follows. Ninety per cent of this firm's production is now in paints. The automatic machinery which makes possible a heavy

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schedule is outlined and illustrated, and a flow-sheet is included.[8]

In the same issue of PAINT AND VARNISH PRODUCTION, Hollister discusses aerosol paint production problems, reviewing factors to be considered in choosing whether to fill products oneself or to contract for filling: experience is said to indicate that an annual volume of five million at least is the floor for filling oneself.[9]

An "inside story" by Rothschild deals with the manufacture of aerosol paints. Rothschild cites the development of this method of packaging paints, its advantages, and predicts that by 1970 sales of aerosol paints will top 250,000,000 cans. While he discusses some of the problems and reviews the kinds of aerosol paint now available, his article is more specifically a discussion of the procedures used, and products made, by the Illinois Bronze Powder Company (Chicago). This firm has adopted the pressure method of filling aerosol packages, because they feel it offers greater flexibility. It is slower, but obviates the difficulties associated with low temperature. One problem that Illinois Bronze had was that of entrapped air, which tended to corrode the can and give a false impression of pressure. The firm is now developing a technique of filling that combines both cold and pressure methods: product base is loaded at room temperature, then a slight amount of cool propellent is added to the unsealed can. As the cool propellent vaporizes, it tends to displace air from the "head space" above the liquid level in the can. Rothschild also discusses problems fo formulation and of choice of propellent in his article, with particular emphasis upon the fluorocarbons.[10]

The "Aerosol Issue" of *Paint, Oil & Chemical Review* contains an article by Harmon and Valdisch dealing with fluorescents in aerosols. Fluorescent compounds were developed about six years ago. While such paints, in their earlier stages, shared the problems common to all early aerosol paints, a particular difficulty was that of excess fading in sunlight. Harmon and Valdisch discuss the way in which Lawter Chemicals, Inc. (Chicago) has solved this problem, as well as others, for example, by the use of smaller and more uniform particle size for pigments, and improvements in formulation. The authors point out that today's fluorescent pigments consist of finely powdered organics which fluoresce brilliantly under ultraviolet or daylight illumination. They are soluble in esters, ketones, and ethers; insoluble in water, aliphatic hydrocarbons and most aromatic hydrocarbons. Acrylic resins appear to be the best carriers. Harmon and Valdisch cite several formulas: for a roller-mill technique, a high-speed dispersion technique (both for fluorescent aerosol paints), a fluorescent paint and a filtering clear sealer for aircraft aerosol paints; and a fluorescent aerosol for Styrofoam.[11]

In the second paper in this issue, five experts in the industry answer such diverse questions as what new type of aerosol paints are now available, what types will be marketed in the coming year, what is the "greatest hurdle" in their manufacture, what is the optimum size can for such products, projected future sales figures, and what new materials may be used in the aerosol paints.[12] Following this symposium, Mould writes about carbon dioxide as a propellent. His is "quite frankly" an exploratory article, which cites several of the disadvantages of using compressed gas as propellent in aerosols, with particular reference to

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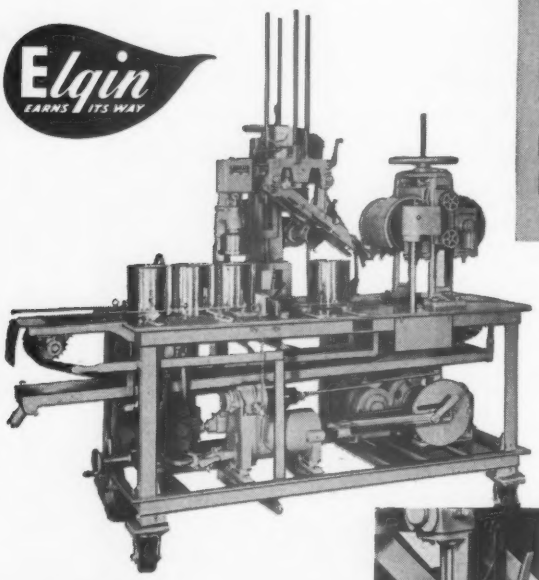

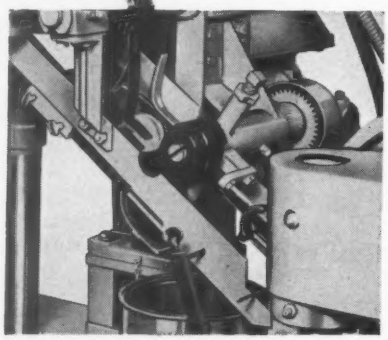

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paints; but he points out that carbon dioxide may offer advantages when used in aerosol paints: for one thing, it appears to obviate to some extent the "pressure drop" that occurs when nitrogen is used. Mould feels that lacquers would logically be the first paint products adaptable to carbon dioxide propellent packaging.[13]

Next paper in this aerosol series deals with the problems of marketing and merchandising aerosol paints; public resistance to such items is generally recognized. In particular, the experience of Plasti-Kote, Inc., in answering consumer objections and questions is analyzed[14] Following this paper, there is an aerosol suppliers directory.[15]

A report issued by the Armour Research Foundation deals with the general problems of calculating the particle size distribution of a polydisperse aerosol from light-scattering measurements.[16] In the same area, Mitchell and Pilcher discuss an improved cascade impactor for measuring aerosol particle size in air pollutants, commercial aerosols and cigarette smoke. Rapid and accurate determinations of particle size are claimed.[17]

The activities and products of Sprayon Products, Inc., are subject of an article in Aerosol Age. The firm produces five lines, the last of these being particularly notable in that it is fully automatic. Pressure filling is used, the reason for adopting this system being that Sprayon's high-speed paint line is geared mainly for small-size orders. For larger volume orders an older Mojonnier cold fill line is used; for some of the small and large volume work one of the three smaller filling lines may be employed.[18]

In a general way, Reed writes about launching a new aerosol product; he considers ten factors to be weighed in marketing such a product, including the market potential, patentability, ease of production, profit margin. The same author elsewhere discusses product, selection pricing, marketing.[19]

An article by Tangermann explores the subject of standardization in the aerosol industry, citing the advantages to be gained, and some of the problems associated with standardizing packages.[20]

Two papers deal with the application of gas chromatography to aerosol products. Jenkins and Amburger discuss the determination of the volatile constituents of aerosol products.[12] Thonet discusses the use of gas chromatography to identify aerosol propellents.[22]

Corrosion testing of aerosol products is the subject of an article by Root and Maury.[23]

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TESTING and ANALYSIS

ASTM Committee D-1 put in an active year in 1959. Of particular interest was the formation of a new subcommittee on statistical application which is giving consideration to the design of cooperative laboratory tests. Attention is also being directed to the types of experimental designs that can be utilized by the working groups of Committee D-1 in establishing the sensitivity and precision of methods of tests. The group recognizes the fact that in some instances only limited data can be obtained in some round-robin tests and that some laboratories do not have the facilities for including all the desirable variables, such as different operators, time, etc. In this connection, efforts are being made, in cooperation with Committee E-11 on Quality Control, to develop experimental designs that can be used under varying circumstances. Each subcommittee will be solicited for test data from completed cooperative tests which will be analyzed to assist in formulating a plan for drafting experimental designs.

Work by the various subcommittees in 1959 produced eight new standards, nine new tentative methods and specifications, the advancement of five tentatives to standard and several revisions of methods.

The new standard tests for varnishes cover: nonvolatile content, elasticity and toughness, acid value, reactivity of paint liquids, resistance to water and alkali resistance of dried film, drying times and exterior durability.

Other work has resulted in specification for strontium chromate, and for basic lead silico-chromate, tests for phthalic acid and benzoic acid isomers in alkyd resins and esters, test for epoxy content of epoxy resins, test for print resistance of varnishes, and a method for evaluating coated specimens subjected to corrosive environments.

A new method for testing efflorescence of interior latex paints was completed. Consideration is being given to the development of a method of testing the adhesions of latex paint to chalky surfaces. A proposed method for measuring the thixotropic properties of paint is also being proposed.

Committee D-17 on Naval Stores working on rosin is studying methods to determine the softening point, to measure crystallization tendencies, and to determine the acid number and saponification number. The objective is to improve present methods or to replace them with improved new methods.

This committee in cooperation with D-1 has developed methods for determining rosin content in protective coatings and methods of testing tall oil fatty acids.

Performance Testing

General

Statistical methods for solving paint problems are discussed in a panel reported in the *Official Digest.* Prane considers the place of statistics and some basic definitions; he points out that any analysis of data is limited by the real validity of the data itself, and examines an example in detail. Holt discusses the precision of test methods in the coatings industry, with special reference to the application of statistical methods to such testing techniques. He applies precision to specifications for the Viscosity Method, and shows "what can and must be done for all of the official methods used for trading purposes in the coatings industry". Mitton considers errors involved in measuring hiding power—particularly a matter of the relationship of variables; he illustrates his point by a case in which the total error is the sum of two independent errors. In more complex terms, he analyzes the Kubelka-Munk hiding power equation, to show the relative effect on the hiding-power value caused by any error in measuring the variable involved. Final paper in the panel is by Schaeffer and Taylor. This applies the statistical method to problems of pigment dispersion. Specifically, the effects of processing conditions on premix and subsequent roll mill production were investigated.[1]

An article by Shapiro is devoted to the subject of qualitative control in paint finishing. Methods for testing paints and finishes for salt spray resistance, color, gloss, color stability, hydrocarbon resistance, humidity resistance, print resistance, adhesion, abrasion resistance, and shear hardness are cited.[1a].

An article in a Russian source describes a new instrument for micromechanical investigation. The instrument employs a photo-electric optical dynamometer for power measurements, making use of photoelasticity and photoeffect phenomena; the claim is made that the apparatus records expansion and contraction curves, tension relaxation curves, and creep curves. The mechanical properties of plastics and high-molecular compounds were studied, and results are reported here. The device was exhibited in 1958 at the Brussels World Fair.[2]

Some modified testing procedures are reviewed by Wyatt. His paper describes practical modifications in the sedimentation method for testing particle size distribution of ultramarine pigments; the author comments on the tinting strength of the same pigment. Results of the work he discusses are interpreted to indicate that for some pigments, including the ultramarine, if a paint film contains a mixture of pigments of know water absorption characteristics, absorption of the film is in proportion to the quantities of each pigment present.[3]

New instruments for testing paints are cited in *Paint Manufacture.* Made by Sheen Instruments, Richmond (England), these include a rotating cylinder viscometer, a spinning film spreader, a wet film thickness gage, an index gloss meter, and a sag index blade.[4]

Rinse and Dorst discuss testing of exterior paints in Holland. Eighteen exterior and ten interior paint systems composed of forty-two different paints were tested in

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all; the article by Rinse and Dorst reports results for only six systems for wood. Evaluation was done visually by a group of experienced observers. Results of the tests are interpreted to indicate clearly the superiority of modern paints, which do not have the cracking tendency of coatings containing active pigments such as white lead and zinc oxide. A lead titanate paint system was still in good condition after seven years; the traditional systems failed at three years. Rutile titanium dioxide paint coatings on white lead titanium dioxide primer also showed high durability (when an alkyd binder was used). The modern paint systems, however, were more susceptible to fungus growth in field tests; in house tests, no considerable influence of fungus was noted. The composition of priming coats used appeared to exert only a minor influence on durability of the paint systems.[4a]

A two-part article by Whiteley discusses the behavior of paints in tropical climates. In such areas, higher radiation and moisture are experienced; on the other hand, corrosive gases are not so destructive. In marine areas in the tropics, salt spray may be more pronounced than in temperate climates. Ways in which hot weather conditions affect wall primers, decorative and protective coatings, distemper, emulsion paints, cement paints, and limewash are discussed in this article.[5]

An article by Primet, appearing in a Russian journal, is abstracted *in extenso* in *Paint Manufacture.* Russian atmospheric tests of protective coatings are described. The efficacy of four drying oils, including those incorporating synthetic resins from phthalic anhydride, pentaerythritol, styrene, etc., was tested, among other things.[6]

PAINT AND VARNISH PRODUCTION carries an article describing some of the testing devices currently in use in Europe for investigating paints, lacquers, and varnishes. These include the cupping test for extensibility and adhesion, the electro-test for determining moment of crack formation and porosity, the stamping-lacquer test for determining pressing, stamping and drawing properties of stamping lacquers applied to tinplate, and the seam test for ascertaining stamping lacquer properties. The appliances described are made by A. M. Erichsen Co., Hemer-Sundwig, Germany.[7]

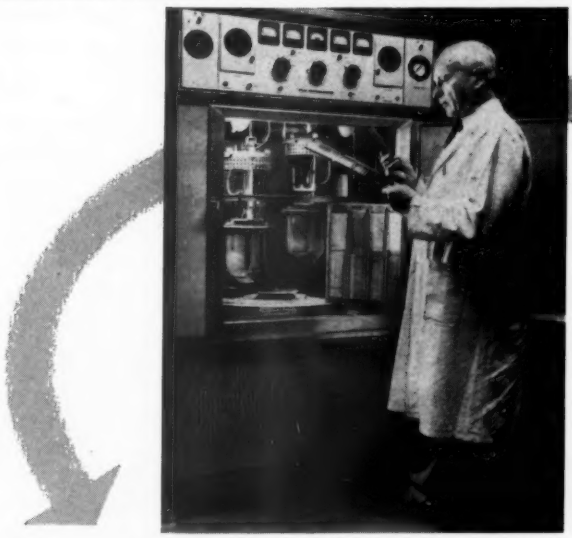
A device to establish drying conditions for protective coatings at elevated temperatures is described by Schwab, Teeter and Cowan. Essentially a modified Sanderson drying-time meter, the apparatus is smaller, and is constructed in an oven where temperatures up to 260°C. can be maintained. Tests were made with vinyl ether formulations.[8]

Testing Specific Properties

Hoffmann and Georgoussis consider the measurement of adhesion of paint films. The simple technique they used makes it possible to measure the pressure necessary to lift a paint film from a substrate or from another paint film.[9]

The *Official Digest* carries a paper on the Bratt conductivity cell for measuring chemical resistance. The cell, introduced by O. H. Brett in 1955, is described, and its application, limitations, and the effect of varying conditions of testing are investigated. Results obtained in these tests are interpreted to justify recommendation of the cell as a possible ASTM method.[10]

Fink-Jensen, in a German source, deals with use of mechanical spectra for understanding deformation properties of varnish films. Using springs and damping pots, the elastic and viscosity properties of films were explained; mechanical spectra, retardation curves, and



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relaxation times indicated the structure of models. Mechanical film properties were determined by correlating stress and deformation, measured by indentation and pendulum hardness.[11]

Determination of the modulus of elasticity in films is the subject of an article by Van Hoorn and Bruin. In the method they describe, the resonance frequency for bending vibrations of metallic bars, both as such and after being covered with a thin layer of asphalt, are determined. From the difference in reasonance frequency, the dynamic modulus of elasticity can be calculated. Examples are cited.[12]

The April issue of the *Journal of the Oil and Colour Chemists' Association* carries an article on the difficulties inherent in the hardness grading of surface coatings, the report of results of a cooperative investigation undertaken by the Manchester Section of the Association. Grading is based on hand tests, scratch hardness, and other methods as desired. In reviewing their tests and results, the investigators concluded that, in the region of scratch hardness of 2000 g., grading either by empirical hand tests or conventional methods is unreliable, and should be the subject of serious study (work here was done with typical industrial finishes, falling within a valid hardness range, medium and soft), and that specification of hardness based on existing methods of test has little significance in films of scratch hardness above 2000 g.[13]

Van Eyken and Anderson describe an improved method for determining hiding power. The procedure they discuss is a quantitative and precise semi-micro method, requiring only one draw-down operation. A Dow multi-notch applicator is used. Reflectance values are read on a Penopac Chart, with a specially devised attachment to the Gardner Automat. Photometric unit used is the All-Purpose High-Sensitivity Extension Head. Calculation of results is discussed: latex white flat wall paint, dark blue semi-gloss enamel, latex flat blue wall paint and green semi-gloss enamel were tested. There are several charts.[14]

A brief survey by Heikel deals with hiding balance as a measurable property of paint, reviewing the optical characteristics of pigment and binder, as these affect the ability of the paint to hide the substrate. A description of a process for measuring hiding power balance and practical suggestions for obtaining paints with good hiding balance are included.[15]

Widmer devotes an article to the oxygen adsorption of air-drying coating films.[15a] A paper by Randet discusses reflectance and the apparatus for measuring it.[15b]

In an article dealing with the natural weathering of white emulsion paints, Hibbard describes results with four dispersions, variously pigmented, and compared on three substances, using three priming systems. Translated from the journal *Verfkroniek*, the paper describes formulation of the paints, tests on wooden panels, on concrete slabs, and on primed undercoated steel. Conclusions: of the media tested on wood, the conventional American house paint affords best protection, followed by alkyd and PVA emulsion systems; for appearance, the PVA emulsion paints are best; polystyrene and styrene-butadiene paints do not appear satisfactory as exterior paints; for vertical surfaces, under special weather conditions, a PVA paint with a pigment volume concentration of 22% does not appear sufficient; rough-cast concrete retains more dirt than smooth concrete; zinc sulfide is unsuitable as sole pigment for exterior emulsion paints.[15c]

An improved air permeability apparatus, a modification of the Carman and Malherbe device, is said to yield results correlating with the nitrogen sorption. The method is applicable to powders in a wide range, is simple to use and precise in results.[16]

Film thickness relationships of organic coatings are discussed by Wetz, Golding and Case. In their work, they found that viscosity characteristics of materials had no effect on correlations; that the dry-film thickness could be related precisely to wet-film thickness, using film densities and composition; and that dry-film thickness was also linearly related to the product of gate-setting and weight-fraction of solids in the coated material.[17]

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Brightwell writes of high precision nondestructive thickness measurements of organic coatings. Infrared interferometry was used to measure loss of film thickness (degradation) of various polymeric materials both clear and pigmented. Results are shown to be satisfactory; the method detected large differences between different polymeric systems and also indicated protection given by pigmentation of the same systems.[17a]

Analysis of Paints

A paper by Swann and Esposito treats of analysis of water emulsion paints. Their work was concerned specifically with paints based on butadiene-stryene, polyvinyl acetate, and polyacrylic copolymers; but they assert that the procedures they tried are suitable, with some modification, to emulsion coatings based on other polymers. In particular, they have found a solution to the problem of separating the pigments from the polymer portion of water emulsion paints; this is said to supply a basis for complete analysis of this type of coating.[1]

Reuter, in *Farbe und Lack*, duscusses the analysis of varnish raw materials and films by infrared spectroscopy. The method is applied to investigation of resins, solvents, and plasticizers. Chemical changes during heating, hardening, or irradiation of polymers can be determined.[2]

Kronstein deals with the use of infrared reflectance spectrum and emission spectroscopy in studying organic coatings. His paper discusses instrumental methods and the characteristics of organic films and their interaction with substrata. Results of the work described indicated the feasability of the emission spectroscopic method for study of paint-interface reactions, and showed that the reaction produced from the wash primer over 1010 steel is essentially an iron-zinc-phosphorus compound with chromium present in very small amounts only.[3]

Garmsen and Kajuter write about analytical methods for the determination of chalking of weathered panels. The degree of chalking is determined by washing a 100 sq. cm. area ten times with distilled water, evaporating, and weighing the residue. Usual rub method of chalk determination is dependent on tinting strength, which varies with pigment formulation.[4]

The analysis of terephthalate polyesters wire enamels is the subject of a paper by Hummel; the method is described in detail.[5]

Analysis of Pigments

Harkins, Harris and Shreve report the results of infrared spectroscopic examination of pigments in paint products. The pigments can usually be classified as inorganic and/or organic by the number and shape of the absorptive bands observed.[6]

In an Indian journal, the iodometric determination of zinc in ammonium bifluoride buffer medium is described; this is said to be a rapid means of estimating the total zinc oxide in a paint.[7]

The pycnometric determination of the density of pigments, and its accuracy, are discussed by Rehacek. He emphasizes that ASTM D-153-154 methods A and B do not take into account the effect that temperature differences have on density determinations, and says that pigment volume should be at least 2% of the pycnometer volume.[8]

In the *Journal of the Oil and Colour Chemists' Association*, for April, 1959, Andrews discusses an easily constructed, inexpensive spectrograph. Its use in the qualitative analysis of inorganic paint pigments and raw materials is also described; these include zinc chromate, barium chromate, red iron oxide, talc and antimony oxide.[9]

Analysis of Resins and Vehicles

Adams and Swann discuss the colorimetric determination of urea in urea-formaldehyde resins. Their paper describes the application of Ehrlich's reagent, *p*-dimethylaminobenzaldehyde, to analyze urea-formaldehyde coating resins for their urea content.[10]

A paper in *Official Digest* deals with the infrared determination of ratio of *trans* to *cis* isomers in polyesters prepared from maleic or fumaric acid. This is a method for calculating ratio in polyesters prepared from α,β unsaturated ethylenic dibasic acids and several polyols from infrared spectra of the films cast on rock salt plates. The technique is considered an important quality control test.[11]

The condensation and thermal stability of silicone resins are examined by Noll, Damm and Krauss. They describe a new procedure, employing titration with phenylisocyanate and Karl Fisher reagent.[12]

Spagnolo, in a two-part article, discusses the determination of rosin in protective coating vehicles. This is essentially a tentative method of test for total rosin acids content of coating vehicles, unmodified by such materials as phenolics or maleic anhydride. The series describes in detail the Spagnolo method for determining this content in varnishes and alkyd resin solutions; the apparatus, reagents, procedures, as well as a revised Battelle method are dealt with.[13]

In *Verfkroniek*, Deeleman and van der Schee discuss solids content of urea resins; this value depends on such factors as baking schedule, film thickness, and choice of alkyd resin for condensation.[14]

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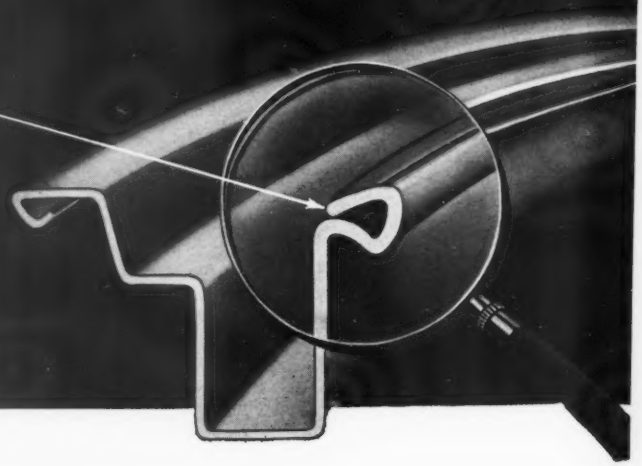

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Pirineos 247 (Portales)
Mexico, D. F.

Columbian Carbon Company
Mapico Iron Oxides Unit
CANADA
Columbian Carbon (Canada), Ltd.
Carbon Black and Pigment Div.
7147 Park Avenue
Montreal 15, Quebec

Commercial Solvents Corporation
CANADA
Northwest Nitro-Chemicals Ltd.,
Medicine Hat,
Alberta, Canada

MEXICO
Comsolmex, S. A.,
Mexico 7, D. F.

Concord Mica Corporrion
CANADA
Kingsley and Keith (Canada) Ltd.
3400 Namur Street, Montreal, Que.

Crown Cork & Seal Co.
CANADA
Crown Cork and Seal Co. Ltd.
Toronto, Canada

The Cuno Engineering Corporation
CANADA
Peacock Bros. Ltd.
P.O. Box #1040
Montreal 3, Quebec, Canada

D

J. H. Day Co.
MEXICO
T. & Hijos De la Pena
Nazas 45 A Col.
Cuauhtemoc
Mexico, D. F.

Dehydag, Deutsch Hydrierwerke GmbH
CANADA
Canerpa Ltd.
1117 St. Catherine St., W.
Montreal, Quebec

MEXICO
Tamm & Cia. S. A.
Isabel la Catolica 69
Mexico, D. F.

Diamonite Products Mfg. Company
CANADA
N-T Steel (Canada)
283 Bering Avenue
Toronto, Ontario, Canada

The Dow Chemical Company
CANADA
Dow Chemical Co.
600 University Ave.
Toronto 2, Ontario

MEXICO
Dow Chemical Co.
Edificio la Commercial
Paseo de la Reforma 122
Mexico 6, D. F.

Dow Corning Corporation
CANADA
Dow Corning Silicones Ltd.
Downsview,
Metropolitan Toronto, Ontario

MEXICO
Ing. Juan M. Vinageras
P.O. Box 20369
Mexico, D. F.

E. I. DuPont De Nemours & Co., Inc.
Elastomer Chemicals Dept.
CANADA
Du Pont of Canada, Ltd.
85 Eglinton Avenue East
Toronto 85, Canada
MEXICO
Du Pont S. A. de C. V.
Av. Juarez 117, Apartado 1799,
Mexico, D. F.

E

Eastman Chemical Products, Inc.
MEXICO
Mr. Egon Meyer
Apartado No. 699
Mexico 1, D. F., Mexico

The Elwell-Parker Electric Co.
CANADA
Industrial Equipment Co., Ltd.
90 Bates Road, Outremont
Montreal 8, Quebec

F

Ferro Chemical Division
CANADA
Ferro Enamels (Canada) Ltd.
Oakville, Ontario, Canada

MEXICO
Ferro Enamel deMexico, S. A.
Co. Aragon
Mexico 14, D. F.

Firestone Plastics Co.
Chemical Sales Division
CANADA
Firestone Tire & Rubber Co. of Canada, Ltd.
Hamilton, Ontario

Fischer & Porter Company
CANADA
G. D. Zimmerman
2700 Jane Street
P.O. Box 135
Toronto 15, Ontario

Franklin Mineral Products Company
CANADA
The Pigment & Chemical Co. Ltd.
6333 Decarie Boulevard
Montreal 29

H. B. Fuller Company
CANADA
H. B. Fuller Co. (Canada) Ltd.
1400 Sargent Avenue
Winnipeg, Canada

G

General Aniline & Film Corp.
Antara Chemicals & General Dyestuff Div.
CANADA
Chemical Developments of Canada, Ltd.
420 Lagauchetiere Street West
Montreal 1, Quebec

MEXICO
Anilinas y Quimicas, S. A.
Dr. Vertiz 146/Apartado Postal 1117
Mexico 7, D. F.

General Dynamics Corporation
Liquid Carbonic Div.
CANADA
Liquid Carbonic Canadian Corp, Ltd.
8375 Mayrand,
Montreal 9, Quebec, Canada

MEXICO
Liquid Carbonic de Mexico, S. A.,
Prol. Manuel Gonzalez 3804,
Col. Claveria Sur., Mexico 16, D. F., Mexico
(Mailing Address: Apartado 9590)

L. M. Gilbert Co.
CANADA
Rudel Machinery Co., Ltd.
614 St. James Street, West
Montreal 3, Quebec

Georgia Kaolin Company
CANADA
Harrisons & Crosfield Ltd.
297 St. Paul Street West
Montreal 1, Quebec

The Georgia Marble Co.
Calcium Products Div.
CANADA
Van Waters & Rogers of Canada Ltd.
Commercial Chemicals Division
2625 Skeena Street
Vancouver 12, B. C.

B. F. Goodrich Chemical Company
CANADA
B. F. Goodrich Canada Ltd.
409 Weber Street West
Kitchener, Ontario
MEXICO
Ernesto Del Valle Y Cia., S. A.
Tolsa 64
Mexico 1, D. F., Mexico

The Goodyear Tire & Rubber Co.
Chemical Division
CANADA
Bate Chemical Corp., Ltd.
P.O. Box 53, Station "R"
Toronto 17, Ontario

H

Hayden Mica Company Inc.
CANADA
Prescott & Company Reg'd.
2209 Hingston Avenue
Montreal 28, Quebec

Holland Color & Chemical Company
CANADA
Drew Brown Ltd.
50 Titan Road
Toronto 18, Canada
MEXICO
Egon Meyer
Laga Alberto #442-desp. 6
Apartado 699
Mexico, D. F.

I

Imperial Color Chemical & Paper Corp.
Pigment Color Div.
CANADA
Imperial Paper and Color Corporation Ltd.
P.O. Box 52
St. Johns, Quebec

J

Johns-Manville
CANADA
Canadian Johns-Manville Co., Ltd.
564 Lakeshore Road East
Toronto, Ont.

MEXICO
Johns-Manville Mexicana S. A. de C. V.
Calle 3 Num. 1-B, Alce Blanco
San Bartolo Naucalpan, Edo de Mexico, Mexico

K

Kelco Company
CANADA
Charles Tennant & Company, Ltd.
34 Clayson Road
Weston, Ontario

MEXICO
Propulsora Mercantil, S. A.
La Fragua Num. 4-303
Mexico City, D. F. Mexico

The Karl Kiefer Machine Co.
CANADA
W. B. Shelly and Company
36 St. Andrews Gardens
Toronto 5, Ontario, Canada

Komline-Sanderson Engineering Corporation
CANADA
Komline-Sanderson Limited
34 Queen Street, West
Brampton, Ontario, Canada

M

Manton-Gaulin Manufacturing Company, Inc.
CANADA
Richardson Agencies Ltd.
620 Laurentian Blvd., Suite 4
Postal Address: P.O. Box 2, Station O,
Montreal 9, P.Q.

Marbon Chemical Division of Borg-Warner Corporation
CANADA
Dillons Chemical Company Ltd.
137 Wellington Street West
Toronto 1, Ontario

Merck Marine Magnesium Division
CANADA
Dalex Co. Ltd.
6834 Second Ave.
Rosemount, Montreal

Metalsalts Corporation
CANADA
Natural Products Corporation
2655 Marcel Street
Montreal 9, Canada

Mineral Pigments Corporation
CANADA
Pigment & Chemical Co., Ltd.
6333 Decarrie Boulevard
Montreal 29

Minerals and Chemicals Corporation of America
CANADA
Mackenzie & Feimann Ltd.
970 Malkin Avenue
Vancouver 6, B.C.

Mixing Equipment Co., Inc.
CANADA
Greey Mixing Equipment Limited
100 Miranda Avenue
Toronto 19, Ontario

MEXICO
Oficina Tecnica de Maquinaria, S.A.
Serapio Rendon No. 125
P.O. Box 20681, Mexico 6, D.F.

Monsanto Chemical Company Inorganic Chemicals Division
CANADA
Monsanto Canada Ltd.
P.O. Box 900
Montreal 3, Canada

MEXICO
Monsanto Mexicana S.A.
Medillin 79
Mexico 7 D.F., Mexico

N

National Lead Company De Lore Division
CANADA
Canadian Titanium Pigments, Ltd.
1401 McGill College Avenue
Montreal 2, Quebec

Naugatuck Chemical Div. United States Rubber Co.,
CANADA
Naugatuck Chemicals
Elmira, Ontario

Neville Chemical Company
CANADA
Bate Chemical Corp., Ltd.
5165 Sherbrooke St., West
Montreal, Quebec

MEXICO
Commercial Tropical, S. A.
Apartado Postal #1002
Mexico, D.F.

The New Jersey Zinc Company
CANADA
St. Lawrence Chemical Company, Ltd.
5405 Pare Street
Montreal 16, Quebec

Newport Industries Company Div. of Heyden Newport Chemical Corp.
CANADA
Drew, Brown, Limited
5410 Ferrier Street
Montreal 9

Norcross Corporation
CANADA
W. J. Westaway Co. Ltd.,
38 McNab Street, S.
Hamilton, Ontario

MEXICO
Brassel & Morales
P.O. Box 2064
Mexico, D. F.

P

Pacific Vegetable Oil Corp. Industrial Div.
CANADA
B. & S. H. Thompson & Co., Ltd.
651 Notre Dame Street West
Montreal, Canada

The Patterson Foundry and Machine Company
CANADA
Patterson Foundry & Machine Co. Ltd.
250 Danforth Road
Toronto 13, Ontario

Pennsalt Chemicals Corporation
CANADA
Pennsalt Chemicals of Canada
Oakville, Ontario

MEXICO
Industrial Quimica Pennsalt
Mexico City

Petrometer Corporation
CANADA
Ontor, Ltd.
12 Leswyn Road, Station "T"
Toronto 19, Ontario

MEXICO
Ingenieria y Mantienimiento Industrial, S.A.
Campeche 367,
Mexico 11, D. F.

Pittsburgh Coke & Chemical Company
CANADA
Allied Basic Chemical Co., Ltd.
1100 Craig Street, East
Montreal 24, Canada

MEXICO
Especialidades Industriales Latino-Americanas, S.A.
Lago Chiem Num 48
Mexico 17, D. F.

R

Reichard-Coulston, Inc.
CANADA
Allied Basic Chemical Co. Ltd.
1100 Craig Street East
Montreal 24, Que.

Reichhold Chemicals, Inc.
CANADA
Reichhold Chemicals (Canada) Ltd.
1919 Wilson Avenue
Toronto 15, Ontario

MEXICO
Reichhold Chemicals de Mexico, S.A.
Calle Norte 45, #731
Col. Industrial Vallejo
Mexico City 15, D. F.

Rhodia Inc.
CANADA
Naugatuck Chemicals.
Div. Dominion Rubber Co. Ltd.
550 Papineau Avenue
Montreal, Quebec

MEXICO
Compania Imortadora Francesa, S. A. (Cifra)
Apartado Postal 10263
Mexico 5, D. F.

S

Sandoz, Inc.
CANADA
Sandoz (Canada) Ltd.
220 Metropolitan Blvd.,
Dorval, P.Q.

MEXICO
Sandoz de Mexico, S.A.
Amores 1360, Apartado 25810
Mexico 12, D. F.

Claude B. Schneible Co.
CANADA
Dace Industries, Ltd.
504 Victoria Avenue
P.O. Box 284
Windsor, Ontario

J. Lee Smith & Co., Inc.
CANADA
Chas. Tennant & Co., Ltd.
Montreal 26, Quebec

Sparkler Mfg. Co.
CANADA
Sparkler International Ltd.
1115 Castlefield Avenue
Toronto, Ont.

A. E. Staley Manufacturing Company
CANADA
Butland Industries
603 Evans Avenue
Toronto 14, Ontario

MEXICO
Ernesto Ibarra Y Cia.
Apartado Postal 30288
Mexico 12, D. F.

Standard Ultramarine & Color Company

CANADA
The Caledonia Company Ltd.
1195 Bloor Street West
Toronto, Ontario 4, Canada

MEXICO
Color-Mex, S. A.
Marquez Sterling Num. 3
Mexico 1, D. F.,

Sun Oil Company

CANADA
Sun Oil Company Limited
85 Bloor Street East,
Toronto 5, Ontario

T

Tamms Industries Co.

CANADA
Van Waters & Rogers Inc.
(Commercial Chemicals Div.)
Vancouver, B. C. Canada

Towmotor Corporation

CANADA
Canadian Lift Truck Co., Ltd.
149 Beaumont Avenue
Montreal, Quebec

Troy Chemical Company

CANADA
Pigment & Chemical Company
6333 Decarie Boulevard
Montreal Quebec

MEXICO
Proveedroa Quimica Industrial S. A.
Apartado 28942,
Mexico, D. F.

U

Union Carbide Corporation Silicones Division

CANADA
Bakelite Company,
Division of Union Carbide Canada Limited
40 St. Clair Avenue East,
Toronto 7, Ontario

MEXICO
National Carbon-Eveready S. A.
No. 543 Apartado Postal 20399
Mexico 5, D. F.

V

Velsicol Chemical Corporation

CANADA
Natural Products Corporation
60 Clarkson Street
Toronto, Ontario

Vulcan Containers Inc.

CANADA
Vulcan Containers Limited
15 Bethridge Road
Rexdale (Toronto), Ontario

W

Wallace & Tiernan Inc.

CANADA
Wallace & Tiernan Ltd.
P.O. Box 54, Station H.
Toronto 13, Ontario

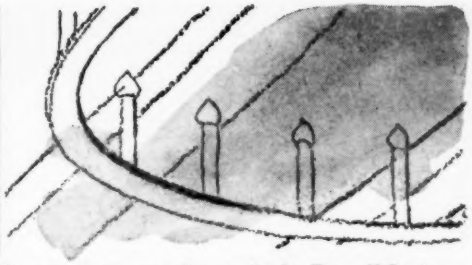
Warwick Wax Div. of The Western Petrochemical Corporation

CANADA
Charles Tennant & Co. (Canada) Ltd.
34 Clayson Road
Weston, Toronto 15, Canada

Witco Chemical Co., Inc.

CANADA
Soden Chemicals Div. of
Witco Chemical Co. Canada
2143 St. Patrick St.
Montreal, Quebec

"When we talked about the Plan person-to-person, participation jumped 30%!"



In our company we've made the Payroll Savings Plan available for some time. I thought, naturally, that we had a large participation. But when I checked up a few weeks ago I discovered that only about 22% of our people were making use of the Plan. It's so easy to say, "Sure, this is a fine idea, and I'll sign up next payday."

What our people needed was someone to explain this convenient savings plan *in person;* someone to show them that just signing the card would put this fine thrift program into automatic operation. They needed somebody to invite them to *start right now.*

When I contacted our State Savings Bonds Director, he helped us set up a thorough, informative canvass of everybody on our staff. As a result more than 30% additional employees signed up for this easy, systematic way to buy U.S. Savings Bonds, *regularly.*

Perhaps *your* organization, too, has a large percentage of employees who have *never been invited* to combine patriotism with basic thrift through the Payroll Savings Plan. Companies with high employee participation are enthusiastic about its benefits in terms of lower employee turnover, better safety records, and the satisfaction engendered by helping large numbers to contribute to our Nation's Peace Power. The greater your employee participation, the more substantial your company benefits will be. Contact your State Savings Bonds Director for prompt, practical help in spreading Payroll Savings information, *person-to-person.*

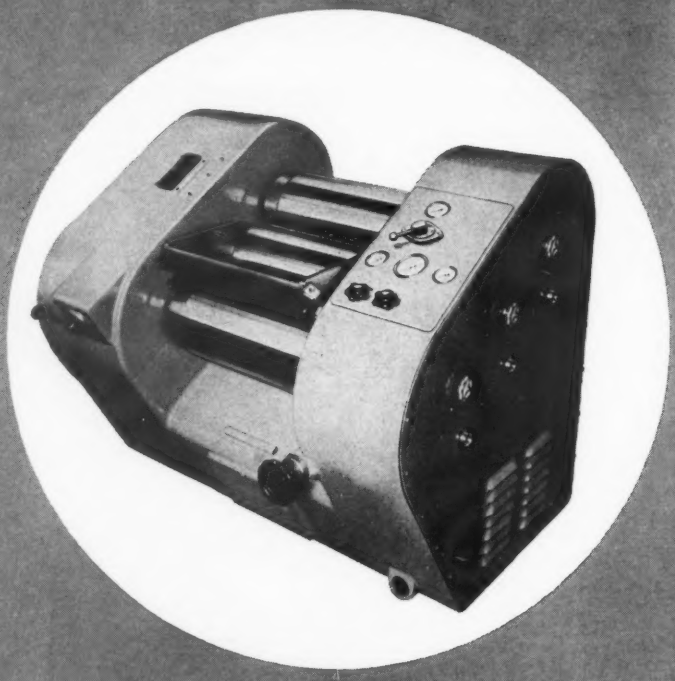
NOW! U. S. SAVINGS BONDS EARN 3¾%

PAINT AND VARNISH PRODUCTION

THE U. S. GOVERNMENT DOES NOT PAY FOR THIS ADVERTISEMENT. THE TREASURY DEPARTMENT THANKS, FOR THEIR PATRIOTISM, THE ADVERTISING COUNCIL AND THE DONOR ABOVE.

New fully hydraulic

BUHLER 3-Roll Mill



SDA
Roll Dimensions: 10" x 20"

SDT
Roll Dimensions: 16" x 32"
16" x 40"

• Up to 60% higher output

• Absolutely even pressures for uniformly fine grinding

1. New hydraulic regulating system provides absolute pressure stability and easiest (1 second) setting of rolls.

2. Determines exact pressure for any formula and duplicates it for that formula at any time.

3. Rolls disengage for cleaning in *1 second.* A simple hand-lever shift disengages rolls and scraper blade instantly. By shifting hand-lever back to operating position, rolls and scraper blade are restored to the exact pressure they were set at before disengaging.

4. New feed hopper arrangement increases working surface. Hopper cheeks do not rest on the roll, but are hydraulically pressed to the shoulder of the roll; permit grinding across the whole length of the roll, with even wear.

5. Hydraulically operated scraper blade maintains selected pressure irrespective of wear. Never loses pressure — hydraulic control takes up automatically to maintain exact selected pressure with wear.

6. Can be furnished with variable speed drive for the first roll, or driven by a 2- or 3-speed motor. Regulating the speed of the first roll for paints and inks of different consistencies increases the capacity 60% and more.

BUHLER BROTHERS, INC. (U.S.A.)
130 COOLIDGE AVENUE, ENGLEWOOD, NEW JERSEY

BUHLER BROTHERS, (CANADA) **LTD.**
24 KING STREET WEST
TORONTO 1, ONTARIO

For more information circle No. 99—last page

MATERIALS AND EQUIPMENT DIRECTORY

Each product classification has been assigned a number to facilitate the reader in determining what materials and equipment are offered by those firms listed in the Suppliers of Raw Material and Equipment Directory on page 175.

ADDITIVES
1

Anti-Foaming Agents

Air Reduction Chemical Co.
American Cyanamid Co., Organic Chemical Div.
Antara Chemicals, Sales Div., General Aniline & Film Corp.
Apex Chemicals Co., Inc.
Baker Castor Oil Co.
Celanese Chemical Company, a Div. of Celanese Corp. of America
Colloids, Inc.
Commercial Solvents Corp.
Dow Corning Corp.
E. I. du Pont de Nemours & Co.
El Dorado Div. Foremost Food and Chemical Co.
W. H. Fales Co.
General Electric Co., Silicone Products Dept.
Glyco Products Co., Inc.
Hercules Powder Co.
Hodag Chemical Corp. Isochem
Kraft Chemical Co.
Mona Industries, Inc.
Naftone, Inc.
Nopco Chemical Co.
Nuodex Products Co., Div. of Heyden-Newport Chemical Corp.
Onyx Chemical Corp.
Chas. Pfizer & Co., Inc.
Raybo Chemical Co.
Silicones Div., Union Carbide Corp.
Smith Chemical & Color Co., Inc.
Sole Chemical Corp.
Synthetic Chemicals, Inc.
Troy Chemical Co.
Union Carbide Chemical Co.
R. T. Vanderbilt Co.
Western Solvents & Chemicals Co.
Witco Chemical Co., Inc.
Wyandotte Chemicals Corp.

Anti-Floating Agents

Baker Castor Oil Co.
Commercial Solvents Corp.
Dow Corning Corp.
General Electric Co., Silicone Products Dept.
Imperial Paper & Color Corp.
Raybo Chemical Co.
Synthetic Chemicals, Inc.
Troy Chemical Co.
Witco Chemical Co., Inc.
Wyandotte Chemicals Corp.

Anti-Flooding Agents

Advance Solvents & Chemical Div. of Carlisle Chemical Works, Inc.
American Lecithin Co.
Baker Castor Oil Co.
Godfrey L. Cabot, Inc.
Dow Corning Corp.
Raybo Chemical Co.
Silicone Div. Union Carbide Corp.
A. E. Staley Mfg. Co.
Synthetic Chemicals, Inc.
Troy Chemical Co.
Witco Chemical Co., Inc.
Wyandotte Chemicals Corp.

Anti-Freeze for Emulsion Paints

Olin Mathieson Chemical Corp.

Anti-Livering Agents

Advance Solvents & Chemical Div. of Carlisle Chemical Works, Inc.
Commercial Solvents Corp.
Mona Industries, Inc.
Pennsalt Chemical Corp.
Raybo Chemical Co.
Synthetic Chemicals, Inc.
Western Solvents & Chemicals Co.
Witco Chemical Co., Inc.

Anti-Sagging Agents

Advance Solvents & Chemical Div. of Carlisle Chemical Works, Inc.
American Lecithin Co., Inc.
Baker Castor Oil Co.
Godfrey L. Cabot, Inc.
Dehydag, Deutsche Hydrierwerke GmBH
W. H. Fales Co.
Ferro Chemical Div.
Jones-Dabney Co.
Millinckrodt Chemical Works
Merck Marine Magnesium Div.
Nopco Chemical Company
Nuodex Products Co., Div. of Heyden-Newport Chemical Corp.
Olin Mathieson Chemical Corp.
Raybo Chemical Co.
Synthetic Chemicals, Inc.
Troy Chemical Co.
Witco Chemical Co.
Wyandotte Chemicals Corp.

Anti-Settling Agents

Advance Solvents & Chemical Div. of Carlisle Chemical Works, Inc.
Baker Castor Oil Co.
Godfrey L. Cabot, Inc.
Dehydag, Deutsche Hydrierwerke GmBH
W. H. Fales Co.
Fallek Products Co.
Foremost Food & Chemical Co.
B. F. Goodrich Chemical Co.
Mallinckrodt Chemical Works
Merck Marine Magnesium Div.
Minerals & Chemicals Corp. of America
Mona Industries, Inc.
National Lead Co.
Nuodex Products Co., Div. of Heyden-Newport Chemical Corp.
Olin Mathieson Chemical Corp.
M. W. Parsons-Plymouth, Inc.
Silicone Div. of Union Carbide Co.
Synthetic Chemicals, Inc.
Witco Chemical Co.
Wyandotte Chemicals Corp.

Anti-Skinning Agents

Advance Solvents & Chemical Div. of Carlisle Chemical Works, Inc.
Commercial Solvents Corp.
Glidden Co.
Heyden-Newport Chemical Corp.
Naftone, Inc.
National Aniline Div., Allied Chemical Corp.
Neville Chemical Co.
Nuodex Products Co., Div. of Heyden-Newport Chemical Corp.
Pennsalt Chemicals Corp.
Raybo Chemical Co.
The Shepherd Chemical Co.
Sindar Corp.
Synthetic Chemicals, Inc.
Troy Chemical Co.
Western Solvents & Chemicals Co.

Bactericides

Armour Industrial Chemical Co.
Antara Chemicals, a Sales Div. of General Aniline & Film Corp.
Buckman Laboratories, Inc.
The California Ink Co., Inc.
Callery Chemical Co.
Commercial Solvents Corp.
Dow Chemical Co.
E. I. du Pont de Nemours
Key Chemicals Corp.
Metalsalts Corp.
Nuodex Products Co., Div. Heyden-Newport Chemical Corp.
Onyx Chemical Corp.
Pennsalt Chemical Corp.
Chas. Pfizer & Co., Inc.
Sindar Corp.
Troy Chemical Co.
R. T. Vanderbilt Co.
Western Solvents & Chemicals Co.
Witco Chemical Co.

Bodying Agents

Advance Solvents & Chemical, Div. of Carlisle Chemical Works, Inc.
Alkydol Laboratories, Div. of Reichhold Chemicals, Inc.
American Cyanamid Co., Organic Chemical Div.
Baker Castor Oil Co.
H. B. Davis Co.
W. H. Fales Co.
B. F. Goodrich Chemical Co.
J. M. Huber Corp.
Jones-Dabney Co.
Kelco Co.
Mallinckrodt Chemical Works
Merck Marine Magnesium Div.
Mona Industries, Inc.
Monsanto Chemical Co., Plastics Div.
Nuodex Products Co., Div. of Heyden-Newport Chemical Corp.
Olin Mathieson Chemical Corp.
Raybo Chemical Co.
Ross & Rowe, Inc.
Stein, Hall & Co., Inc.
Troy Chemical Co.
Witco Chemical Co., Inc.

Carboxymethylcellulose

Dow Chemical Co.
E. I. du Pont de Nemours
Hercules Powder Co.
H. Kohnstamm & Co., Inc.
Wyandotte Chemicals Corp.

Casein

Borden Chemical Co.
W. H. Fales Co.

Chlorinated Paraffin

R. J. Brown Co.
Central Solvents & Chemicals Co.
Diamond Alkali Co.
Hercules Powder Co.
Hooker Chemical Co.
Union Carbide Plastics Co.
Western Solvents & Chemicals Co.

Corrosion Inhibitor

Air Reduction Chemical Co.
Amchem Products, Inc.
Antara Chemicals, A Sales Div. of General Aniline & Film Corp.
Armour Industrial Chemical Co.
The California Ink Co., Inc.
E. I. du Pont de Nemours & Co.
Enjay Co., Inc.
General Mills, Chemical Div.
Hercules Powder Co.
Heyden-Newport
Kolker Chemical Corp.
Nuodex Products Co. Div. of Heyden-Newport Chemical Corp.
Raybo Chemical Co.
Solvay Process Div., Allied Chemical Corp.
Tennessee Products & Chemical Corp.
Western Solvents & Chemicals Co.
Wyandotte Chemicals Corp.

Curing Agents

Anderson Chemical Co.
Borden Chemical Co.
Dow Chemical Co.
E. I. du Pont de Nemours & Co.
General Mills, Inc. Chemical Div.
Harshaw Chemical Co.
Hercules Powder Co.
Jones-Dabney Co.
Monsanto Chemical Co., Inorganic Chemicals Div.
Nuodex Products Co., Div. of Heyden-Newport Chemical Corp.
Pennsalt Chemical Corp.
Synthetic Chemicals. Inc.

Deodorants

Aromatic Products Inc.
Godfrey L. Cabot, Inc.
Dodge & Olcott
Dow Chemical Co.
Fritsche Bros.
Onyx Chemical Corp.
Polak & Schwartz, Inc.
Rhodia, Inc.
Sindar Corp.
van Ameringen-Haebler, Inc. Div. of Internat'l Flavors & Fragrances, Inc.

Dispersing Agents

Air Reduction Chemical Co.
American Cyanamid Co. Organic Chemical Div.
American Lecithin Co.
Antara Chemicals, Co., A Sales Div. General Aniline & Film Corp.
Armour Industrial Chemical Co.
Atlantic Refinery Co.
Atlas Powder Co.
Baker Castor Oil Co.
The California Ink Company, Inc.
Colloids, Inc.
Commercial Solvents Corp.
Deutsche Hydriewerke GmBH
Dewey and Almy Chemical Div. W. R. Grace & Co.
Dow Chemical
Fallek Products Co.
Farnow, Inc.
Geigy Corp. Industrial Chemical Div.
General Mills, Chemical Div.
Glyco Products Co.
Harshaw Chemical Co.
Johns-Manville
Mona Industries, Inc.
National Aniline Div., Allied Chemical Corp.
Nopco Chemical Co.
Nuodex Products Co., Div. of Heyden-Newport Chemical Corp.
Olin Mathieson Chemical Corp.
Onyx Chemical Corp.
Oronite Chemical Co.
Pennsalt Chemical Corp.
Raybo Chemical Co.
Rohm & Haas Co.
Silicone Div., Union Carbide Co.
Smith Chemical and Color, Inc.
A. F. Staley Mfg. Co.
Synthetic Chemicals, Inc.
Troy Chemical Co.
Union Carbide Chemical Co.
R. T. Vanderbilt Co.
Western Solvents & Chemicals Co.
Wica Chemicals, Inc.
Witco Chemical Co.
Wyandotte Chemicals Corp.

Dyes for Stains

American Cyanamid Co., Pigment Div.
General Dyestuff Co. A Sales Div. of General Aniline & Film Corp.
National Aniline Div., Allied Chemical Corp.
Sandoz, Inc.
Synthetic Chemicals, Inc.

Emulsifiers

Advance Solvents & Chemical Div. of Carlisle Chemical Works, Inc.
American Cyanamid Co., Organic Chemical Div.
American Lecithin Co., Inc.
Antara Chemicals Co., Sales Div., General Aniline & Film Corp.
Apex Chemical Co., Inc.
Armour Industrial Chemical Co.
Atlantic Refining Co.
Atlas Powder Co.
Baker Castor Oil Co.
Colloids, Inc.
Commercial Solvents Corp.
Deutsche Hydrierwerke GMBH
Dow Chemical Co.
W. H. Fales Co.
Fallek Products Co.
Foremost Food and Chemical Co.
Geigy Corp., Industrial Chemical Div.
Glyco Products Co.
B. F. Goodrich Co.
Kraft Chemical Co.
Mona Industries
Monsanto Chemical Co. Inorganic Chemicals Div.
Monsanto Chemical Co. Plastics Div.
Morningstar-Paisley, Inc.
National Aniline Div., Allied Chemical Corp.
Nopco Chemical Co.
Olin Mathieson Chemical Corp.
Onyx Chemical Corp.
Pennsalt Chemical Corp.
Raybo Chemical Co.
Rohm & Haas Co.

Ross & Rowe
Sole Chemical Corp.
A. E. Staley Mfg. Co.
Stein, Hall & Co., Inc.
Stepan Chemical Co.
Synthetic Chemicals Co.
Union Carbide Chemical Co.
Western Solvents & Chemicals Co.
Wica Chemicals, Inc.
Witco Chemical Corp.
Wyandotte Chemicals Corp.

Esterified Shellac

Acme Shellac Products Co.

Flatting Agents

Godfrey L. Cabot, Inc.
Davison Chemical Co., Div. of W. R. Grace & Co.
Dicalite Div., Great Lakes Carbon Corp.
Dow Corning Corp.
English Mica Co.
Glyco Products Co.
J. M. Huber Corp.
Johns-Manville Sales Corp.
Mallinckrodt Chemical Works
Monsanto Chemical Co., Inorganic Chemicals Div.
Nopco Chemical Co.
Nuodex Products Co., Div. of Heyden-Newport Chemical Corp.
M. W. Parsons-Plymouth, Inc.
The Shepherd Chemical Co.
Smith Chemical and Color, Inc.
Tamms Industries Co.
Tennessee Products & Chemical Corp.
Whittaker, Clark & Daniels, Inc.
Witco Chemical Co.

Flow Controlling Agents

Baker Castor Oil Co.
Godfrey L. Cabot, Inc.
Dow Corning Corp.
General Electric Co. Silicone Products Dept.
B. F. Goodrich Chemical Co.
J. M. Huber Corp.
Jones-Dabney Co.
Mallinckrodt Chemical Works
Merck Marine Magnesium Div.
Mona Industries, Inc.
Nopco Chemical Co.
Nuodex Products Co., Div. of Heyden-Newport Chemical Corp.
Olin Mathieson Chemical Corp.
M. W. Parsons-Plymouth, Inc.
Raybo Chemical Co.
Synthetic Chemicals, Inc.
Troy Chemical Co.
R. T. Vanderbilt Co.
Western Solvents & Chemical Co.
Witco Chemical Co., Inc.
Wyandotte Chemicals Corp.

Fungicides

Advance Solvents & Chemical Div. of Carlisle Chemical Works, Inc.
Antara Chemicals Co., a Sales Div., General Aniline & Film Corp.
Borden Chemical Co.
Buckman Laboratories, Inc.
The California Ink Co., Inc.
Callery Chemical Co.
Denton Edwards, Ltd.
Dianol Div., Mills Pearson Corp.
Dow Chemical Co.
E. I. du Pont de Nemours & Co.
Ferro Chemical Div.
Harshaw Chemical Co.
Heyden-Newport Chemical Corp.
Key Chemicals, Inc.
Mallinckrodt Chemical Works
Metalsalts Corp.
Naftone, Inc.
Nuodex Products Co. Div. of Heyden-Newport Chemical Corp.
Onyx Chemical Corp.
Oronite Chemical Co.
Pennsalt Chemical Corp.
Pfister Chemical Wks, Inc.
Chas. Pfizer & Co., Inc.
Scientific Oil Compounding Co.
The Shepherd Chemical Co.
Sindar Corp.
Fred'k A. Stresen-Reuter, Inc.
Troy Chemical Co.
R. T. Vanderbilt Co.
Western Solvents & Chemical Co.
Witco Chemical Corp.

Gloss Improver

Baker Castor Oil Co.
Dow Corning Corp.
Nuodex Products Co., Div. of Heyden-Newport Chemical Corp.
Raybo Chemical Co.
Troy Chemical Co.
R. T. Vanderbilt Co.

Grinding Aids

Advance Solvents & Chemical Div. of Carlisle Chemical Works, Inc.
Armour Industrial Chemical Co.
Baker Castor Oil Co.
Commercial Solvents Corp.
Dow Corning Corp.
W. H. Fales Co.
General Aniline & Film Corp.
Mona Industries, Inc.
Nopco Chemical Co.
Nuodex Products Co., Div. of Heyden-Newport Chemical Corp.
Raybo Chemical Co.
Ross & Rowe, Inc.
Synthetic Chemicals, Inc.
Troy Chemical Co.
Wyandotte Chemicals Corp.

Inhibitors

Amchem Products, Inc.
Antara Chemicals, Sales Div. of General Aniline & Film Corp.
Borden Chemical Co.
Eastman Chemical Products
Enjay Co., Inc.
Monsanto Chemical Co., Inorganic Chemicals Div.
Nuodex Products Co., Div. of Heyden-Newport Chemical Corp.
Onyx Chemical Corp.
Raybo Chemical Co.
Synthetic Chemicals, Inc.
Troy Chemical Co.
Western Solvents & Chemicals Co.
Witco Chemical Co., Inc.
Insecticides For Paint
Dianol Div., Mills-Pearson Corp.

Latex Additives

American Cyanamid Co. Plastics and Resins Div.
Archer-Daniels-Midland Co.
Borden Chemical Co.
Godfrey L. Cabot, Inc.
E. I. du Pont de Nemours & Co.
W. H. Fales Co.
Farnow, Inc.
Goodyear Tire and Rubber Co., Chemical Div.
Monsanto Chemical Co., Inorganic Chemicals Div.
Monsanto Chemical Co., Plastics Div.
Newport Industries Co., A Div. of Heyden Newport Chemical Corp.
Nopco Chemical Co. Div. of Heyden-Newport Chemical Corp.
Onyx Chemical Corp.
Penna. Ind. Chem. Corp.
Pennsalt Chemical Corp.
Raybo Chemical Co.
Troy Chemical Co.
Western Solvents & Chemicals Co.
Wica Chemicals, Inc.
Witco Chemical Co., Inc.

Lecithin

American Lecithin Co., Inc.
Archer-Daniels-Midland Co.
The Buckeye Cotton Oil Co.
W. H. Fales Co.
Naftone, Inc.
Spencer-Kellogg & Sons, Inc.
A. E. Staley Mfg. Co.
Ross & Rowe, Inc.
Smith Chemical and Color Co., Inc.

Marproofing Agents

Godfrey L. Cabot, Inc.
Nopco Chemical Co.
Raybo Chemical Co.

Masking Agents

Aromatic Product Co.
Dow Chemical Co.
Polak & Schwarz, Inc.
Rhodia, Inc.
Sindar Corp.
Western Solvents & Chemicals Co.
van Ameringen-Haebler, Inc. Div. of Internat'l Flavors & Fragrances, Inc.

Masonry Water Repellents

Borden Chemical Co.
Dow Corning Corp.
Farnow, Inc.
General Electric Co., Silicone Products Dept.
Mallinckrodt Chemical Works
M. W. Parsons Plymouth, Inc.
Penna. Ind. Chem. Corp.
Silicone Div., Union Carbide Corp.

Metal Cleaners

Amchem Products, Inc.
Central Solvents & Chemicals Co.
Dow Chemical Co.
E. I. du Pont de Nemours, Electrochemicals Dept.
Hooker Chemical Co.
Mona Industries, Inc.
Olin Mathieson Chemical Corp.
Pennsalt Chemical Corp.
Pfister Chemical Works, Inc.
Western Solvents & Chemicals Co.
Wica Chemicals, Inc.

Mildewcides

Advance Solvents & Chemical Div. of Carlisle Chemical Works, Inc.
Antara Chemicals Co. a Sales Div. of General Aniline & Film Corp.
Buckman Laboratories, Inc.
Celanese Chemical Co. A Div. of Celanese Corp. of America
Dianol Div., Mills-Pearson Corp.
Dow Chemical Co.
E. I. du Pont de Nemours & Co., Inc.
Ferro Chemical Div.
Mallinckrodt Chemical Works
Metalsalts Corporation
Naftone, Inc.
Nuodex Products Co., Div. of Heyden-Newport Chemical Corp.
Onyx Chemical Corp.
Pfister Chemical Wks., Inc.
The Shepherd Chemical Co.
Sindar Corp.
Troy Chemical Co.
R. T. Vanderbilt Co.
Western Solvents & Chemicals Co.
Witco Chemical Co., Inc.

Odorants

Aromatic Products, Inc.
Dodge & Olcott, Inc.
Fritzsche Bros.
Onyx Chemical Corp.
Polak & Schwarz, Inc.
Rhodia, Inc.
Sindar Corp.
van Ameringen-Haebler, Inc. Div. of International Flavors & Fragrances, Inc.

Paint Remover Ingredients

Anderson-Prichard Oil Corp.
Antara Chemicals, Sales Div. General Aniline & Film Corp.
Borden Chemical Co.
R. J. Brown Co.
Central Solvents & Chemicals Co.
Chemical Solvents, Inc.
Colton Chemical Co., Div. of Air Reduction Co., Inc.
Commercial Solvents Corp.
Dow Chemical Co.
E. I. du Pont de Nemours, Electrochemicals Dept.
Eastman Chemical Products
Kolker Chemicals Corp.
Mallinckrodt Chemical Works
Mercury Chemical Corp.
Neville Chemical Co.
Nopco Chemical Co.
Olin Mathieson Chemical Corp.
Pennsalt Chemical Corp.
Chas. Pfizer Co., Inc.
Plastics & Coal Chemical Div., Allied Chemical Corp.
Shell Chemical Corp.
Solvay Process Div., Allied Chemical Corp.
Velsicol Chem. Corp.
Western Solvents & Chemicals Co.

Phosphate Coatings

Amchem Products, Inc.
E. I. du Pont de Nemours, Electro chemical Dept.
Metalsalts Corporation
Pennsalt Chemical Corp.
U. S. Industrial Chemicals Co., Div. of Nat'l Distillers and Chem. Corp.

Preservatives

Advance Solvents & Chemical Div. of Carlisle Chemical Works, Inc.
Antara Chemicals, a Sales Div. of General Aniline & Film Corp.
Buckman Laboratories Inc.
California Ink Co., Inc.
Dow Chemical Co.
Heyden-Newport Chemical Corp.
Nuodex Products Co., Div. of Heyden-Newport Chemical Corp.
Chas. Pfizer & Co., Inc.
Reichhold Chemicals, Inc.
Sindar Corp.
Troy Chemical Co.
Union Carbide Chemical Co.
Western Solvents & Chemicals Co.

Protective Colloids

Antara Chemicals, Sales Div. of General Aniline & Film Corp.
Borden Chemical Co.
Dow Chemical Co.
W. H. Fales Co.
Hercules Powder Co.
Inerto Co.
Kelco Co.
Monsanto Chemical Co., Plastics Div.
A. E. Staley Mfg. Co.

Puffing Agents

Advance Solvents & Chemical Div. of Carlisle Chemical Works, Inc.
Alkydol Labs., Div. of Reichhold Chemicals, Inc.
Baker Castor Oil Co.
Godfrey L. Cabot, Inc.
H. B. Davis Co.
W. H. Fales Co.
Raybo Chemical Co.
Troy Chemical Co.

Reflective Spheres

Flex-O-Lite Mfg. Co.
Microbeads, Inc.
Potters Bros., Inc.

Sanitizing Agent

Armour Industrial Chemical Co.
Buckman Laboratories, Inc.
Denton Edwards, Ltd.
Dow Chemical Co.
Monsanto Chemical Co., Inorganic Chemicals Div.
Nuodex Products Co., Div. of Heyden-Newport Chemical Corp.
Onyx Chemical Corp.
Sindar Corp.
R. T. Vanderbilt Co.
Witco Chemical Co., Inc.

Shingle Stain Oil

Neville Chemical Co.
Penna. Ind. Chem. Corp.
Plastics & Coal Chemicals Div., Allied Chemical Corp.

Stabilizers

Advance Solvents & Chemical Div. of Carlisle Chemical Works, Inc.
Alkydol Laboratories, Div. of Reichhold Chemical, Inc.
American Cyanamid Co., Organic Chemical Div.
Antara Chemicals, Sales Div. of General Aniline & Film Corp.
Armour Industrial Chemical Co.
Borden Chemical Co.
Godfrey L. Cabot, Inc.
Deutsche Hydrierwerke GmBH
Dow Chemical Co.
Eastman Chemical Products
Fallek Products Co.
Ferro Chemical Div.
Harshaw Chemical Co.
Hercules Powder Co.
Inerto Chemical Co.
National Lead Co.
Mona Industries, Inc.
Monsanto Chemical Co., Inorganic Chemicals Div.
Nopco Chemical Co.
Nuodex Products Co., Div. of Heyden-Newport Chemical Corp.
Olin Mathieson Chemical Corp.
Penna. Ind. Chem. Corp.
Pennsalt Chemical Corp.
Raybo Chemical Co.
Sindar Corp.
Synthetic Chemicals, Inc.
Troy Chemical Co.
Witco Chemical Co.,

Stearates

Advance Solvents & Chemical Div. of Carlisle Chemical Works, Inc.
American Cyanamid Co., Organic Chemical Div.
W. H. Fales Co.
Harshaw Chemical Co.
Mallinckrodt Chemical Works
Metasap Chemical Co.
Nuodex Products Co., Div. of Heyden-Newport Chemical Corp.
M. W. Parsons-Plymouth, Inc.
Nopco Chemical Co.
The Shepherd Chemical Co.
Smith Chemical and Color Co., Inc.
Whittaker, Clark & Daniels, Inc.
Witco Chemical Corp.

Surface Active Agents

Air Reduction Chemical Co.

American Alcolac Corp.
American Cyanamid Co., Organic Chemical Div.
Antara Chemicals, Sales Div. of General Aniline & Film Corp.
Armour Industrial Chemical Co.
Atlantic Refining Co.
Atlas Powder Co.
Baker Castor Oil Co.
Chemical Solvents, Inc.
Colloids, Inc.
Dehydag, Deutsche Hydrierwerke GmBH
Dow Chemical Co.
E. F. Drew & Co., Inc.
E. I. du Pont de Nemours & Co.
W. H. Fales Co.
Fallek Products Co.
Foremost Food & Chemical Co.
Geigy Corp. Industrial Div.
General Mills, Chemical Div.
Glyco Products
Harshaw Chemical Co.
Hercules Powder Co.
Johns-Manville Corp.
Mona Industries, Inc.
Monsanto Chemical Co., Inorganic Chemicals Div.,
National Aniline Div. Allied Chemical Corp.
Nopco Chemical Co.
Nuodex Products Co., Div. of Heyden-Newport Chemical Corp.
Olin Mathieson Chemical Corp.
Onyx Chemical Corp.
Oronite Chemical Co.
M. W. Parsons-Plymouth, Inc.,
Pennsalt Chemical Corp.
Raybo Chemical Co.
Rohm & Haas
Sandoz, Inc.
Silicone Div., Union Carbide Co.
Stepan Chemical Co.
Synthetic Chemicals, Inc.
Troy Chemical Co.
Union Carbide Chemical Co.
Western Solvents & Chemicals Co.
Wica Chemicals, Inc.
Witco Chemical Co.
Wyandotte Chemical Corp.

Surface Preparation Chemicals

Amchem Products, Inc.
Onyx Chemical Corp.
Pennsalt Chemical Corp.
Shell Chemical Corp.

Suspension Agents

American Cyanamid Co., Organic Chemical Div.
Baker Castor Oil Co.
Godfrey L. Cabot, Inc.
Dehydag, Deutsche Hydrierwerke GmBH
Dow Chemical Co.
Fallek Products Co.
B. F. Goodrich Chemical Co.
Hercules Powder Co.
Inerto Chemical Co.
Johns-Manville Corp.
Kelco Co.
Mallinckrodt Chemical Works
Merck Marine Magnesium Div.
Minerals & Chemicals Corp. of America
Mona Industries, Inc.
Nuodex Products Co., Div. of Heyden-Newport Chemical Corp.
Olin Mathieson Chemical Corp.
Onyx Chemical Corp.
Raybo Chemical Co.
The Shepherd Chemical Co.
Stein Hall & Co., Inc.
Synthetic Chemicals, Inc.
Troy Chemical Co.
Western Solvents & Chemicals Co.
Witco Chemical Co.
Wyandotte Chemicals

Thickeners & Gelling Agents

Alkydol Laboratories, Div. of Reichhold Chemicals, Inc.
Anderson Chemical Co.
Antara Chemicals, Sales Div. of General Aniline & Film Corp.
J. S. Ayers & Co.
Baker Castor Oil Co.
Borden Chemical Co.
Godfrey L. Cabot, Inc.
Dehydag, Deutsche Hydrierwerke GmBH
Dow Chemical Co.
W. H. Fales Co.
Fallek Products Co.
Ferro Chemical Div.
B. F. Goodrich Chemical Co.
Hercules Powder Co.
Inerto Chemical Co.
Kelco Co.
Mallinckrodt Chemical Works
Merck Marine Magnesium Div.
Minerals & Chemicals Corp. of America
Mona Industries, Inc.
Monsanto Chemical Co., Inorganic Chemicals Div.
Monsanto Chemical Co., Plastics Div.
Nopco Chemical Co.
Nuodex Products Co., Div. of Heyden-Newport Chemical Corp.
Olin Mathieson Chemical Corp.
Price Varnish Co.
Raybo Chemical Co.
Rohm & Haas Co.
Shawiningan Resins Corp.
Stein, Hall & Co., Inc.
Fred'k Stresen-Reuter, Inc.
Tamms Industries, Inc.
Troy Chemical Co.
Union Carbide Chemical Co.
Viscatone Chemical Co.
Western Solvents & Chemicals Co.
Wyandotte Chemicals Corp.

Ultraviolet Absorbers

American Cyanamid Co. Organic Chemical Div.
Antara Chemicals, a sales Div. of General Aniline & Film Corp.
Buckman Laboratories, Inc.
Dow Chemical Co.
Ferro Chemical Div.
Heyden-Newport
National Aniline Div. Allied Chemical Corp.
Rhodia, Inc.
Sindar Corp.
Witco Chemical Co., Inc.

Vinyl Stabilizers

Alkydol Laboratories, Div. of Reichhold Chemicals, Inc.
American Cyanamid Co., Organic Chemical Div.
Antara Chemicals, a Sales Div. of General Aniline & Film Corp.
Argus Chemical Corp.
Baker Castor Oil Co.
Ferro Chemical Div.
Harshaw Chemical Co.
Hercules Powder Co.
Monsanto Chemical Co., Inorganic Chemicals Div.
Nopco Chemical Co.
Nuodex Products Co., Div. of Heyden-Newport Chemical Corp.
Synthetic Chemicals, Inc.
R. T. Vanderbilt Co.
Witco Chemical Co., Inc.

Waxes

Advance Solvents & Chemical Div. of Carlisle Chemical Works, Inc.
Air Reduction Chemical Co.
Baker Castor Oil Co.
Bareco Oil Co.
Central Solvents Chemical Co.
Commercial Solvents Corp.
Glyco Products Co.
Eastman Chemical Products
The Mantrose Corp.
Nopco Chemical Co.
Semet-Solvay, Petrochemical Div.
Shell Oil Co.
Sun Oil Co.
Union Carbide Plastics Co.
Warwick Wax Div., Western Petrochemical Corp.
Western Solvents & Chemicals Co.
Witco Chemical Co.
G. S. Ziegler & Co.

DRIERS
2

Advance Solvents & Chemicals, Div. of Carlisle Chemical Works, Inc.
California Ink Co., Inc.
Ferro Chemical Div.
Harshaw Chemical Co.
McCloskey Varnish Co.
McGeon Chemical Co.
Mooney Chemicals, Inc.
Naftone, Inc.
Nuodex Products Co., Div. of Heyden-Newport Chemical Corp.
Oronite Chemical Co.
Shepherd Chemical Co.
Sherwin-Williams, Pigment, Color and Chemical Div.
Smith Chemical and Color Co., Inc.
Fred'k A. Stresen-Reuter, Inc.
Troy Chemical Co.
Witco Chemical Co.

Drying Accelerators

Harshaw Chemical Co.

Nuodex Products Co., Div. of Heyden-Newport Chemical Corp.
The Shepherd Chemical Co.
Troy Chemical Co.
Witco Chemical Co., Inc.

DRYING OILS
3

African Wood Oil
Pacific Vegetable Oil Corp., Ind. Div.

Acidulated Oils
Pacific Vegetable Oil Corp., Ind. Div.

Castor Oils
Baker Castor Oil Co.
Brazilian Industrial Oils, Inc.
Degen Oil & Chemical Co.
Farnow, Inc.
T. F. McAdam, Inc.
National Lead Co.
Pacific Vegetable Oil Corp., Ind. Div.
Sherwin-Williams Co., Pigment, Color and Chemical Div.
Spencer Kellogg & Sons, Inc.
Wallace & Tiernan, Harchem Div.
Woburn Chemical Corp.

Coconut
Archer-Daniels-Midland Co.
Cargill, Inc.
E. F. Drew & Co.
Emery Industries, Inc.
Glidden Co.
Kraft Chemical Co.
T. F. McAdam, Inc.
Pacific Vegetable Oil Corp. Ind. Div.
Spencer Kellogg & Sons, Inc.

Cotton Seed
Archer-Daniels-Midland Co.
E. F. Drew & Co.
Emery Industries, Inc.
Pacific Vegetable Oil Corp., Ind. Div.
Spencer-Kellogg & Sons, Inc.

Dicyclopentadiene Copolymers
Archer-Daniels-Midland Co.
Cargill, Inc.
Spencer Kellogg & Sons, Inc.

Fish Oil
Archer-Daniels-Midland Co.
Cargill, Inc.
Crownoil Chemical Co.
Degen Oil & Chemical Co.
Farnow, Inc.
Haynie Products, Inc.
T. F. McAdam, Inc.
Wallace & Tiernan, Harchem Div.
Werner G. Smith, Inc.

Isano
Pacific Vegetable Oil Corp., Ind. Div.

Linseed Oils
Archer-Daniels-Midland Co.
Cargill, Inc.
Central Solvents & Chemicals Co.
Degen Oil & Chemical Co.
Farnow, Inc.
T. F. McAdam, Inc.
National Lead Co.
Spencer Kellogg & Sons, Inc.
Minnesota Linseed Oil Co.
Pacific Vegetable Oil Corp., Ind. Div.
Sherwin-Williams Co., Pigment, Color and Chemical Div.
Western Solvents & Chemicals Co.

Oiticica
Brazil Oiticica, Inc.
Brazilian Industrial Oils, Inc.
Degen Oil & Chemical Co.
Farnow, Inc.
T. F. McAdam, Inc.
Pacific Vegetable Oil Corp. Ind. Div.

Petroleum Drying Oils
R. J. Brown Co.
Sun Oil Co.

Safflower
Degen Oil & Chemical Co.
Spencer Kellogg & Sons, Inc.
Pacific Vegetable Oil Corp. Ind. Div.

Sesame
Pacific Vegetable Oil Corp. Ind. Div.

Sunflower
Pacific Vegetable Oil Corp., Ind. Div.

Soybean Oils
Archer-Daniels-Midland Co.
Cargill, Inc.
Degen Oil & Chemical Co.
E. F. Drew
Emery Industries, Inc.
Farnow, Inc.
Glidden Co.
General Mills
T. F. McAdam, Inc.
Minnesota Linseed Oil Co.
Pacific Vegetable Oil Corp. Ind. Div.
Spencer Kellogg & Sons, Inc.
A. E. Staley Mfg. Co.

Styrenated Oils
Degen Oil & Chemical Co.
Farnow, Inc.
Spencer Kellogg & Sons, Inc.
Woburn Chemical Corp.

Tall Oils
Arizona Chemical Co.
Cental Solvents & Chemicals Co.
Crosby Chemicals, Inc.
Degen Oil & Chemical Co.
Farac Oil & Chemical Co.
Glidden Co.
Hercules Powder Co.
Kraft Chemical Co.
T. F. McAdam, Inc.
Newport Industries Co., Div. of Heyden-Newport Chemical Co.
Werner G. Smith, Inc.
Union Bag & Paper Corp.
Wallace & Tiernan, Harchem Div.
West Virginia Pulp & Paper Co., Ind. Chem. Sales Div.
Western Solvents & Chemicals Co.

Tung Oil
Degen Oil & Chemical Co.
Internatio-Rotterdam
T. F. McAdam, Inc.
Pacific Vegetable Oil Corp., Ind. Div.
Werner G. Smith, Inc.

Vegblend
Minnesota Linseed Oil Co.

Vinyltoluene Copolymers
Spencer Kellogg & Sons, Inc.

FATTY ACIDS, ESTERS AND DERIVATIVES
4

Antara Chemicals, a Sales Div. of General Aniline & Film Corp.
Archer-Daniels-Midland Co.
Arizona Chemical Co.
Armour Industrial Chemical Co.
Atlas Powder Co.
Baker Castor Oil Co.
Crosby Chemical Co.
Degen Oil & Chemical Co.
E. F. Drew & Co.
Emery Industries
Fallek Products Co., Inc.
Foremost Food & Chemical Co., El Dorado Div.
General Mills, Chemical Div.
Glidden Co.
Glyco Products Co.
A. Gross & Co.
Harchem Div., Wallace & Tiernan, Inc.
Hercules Powder Co.
T. F. McAdam, Inc.
Onyx Chemical Corp.
Pacific Vegetable Oil Corp., Ind. Div.
M. W. Parsons-Plymouth, Inc.
Solvents & Chemicals Group
Swift & Co.
West Virginia Pulp and Paper, Ind. Chem. Sales Div.
Woburn Chemical Corp.

INTERMEDIATES
5

Anhydrides & Acids
Adipic Acid
E. I. du Pont de Nemours & Co.
National Aniline Div., Allied Chemical Corp.
Plastics & Coal Chemicals Div., Allied Chemical Corp.
Azelaic Acid
Armour Co., Chemical Div.
Emery Industries, Inc.
Benzoic Acids
Heyden-Newport Chemical Corp.
Kolker Chemicals Corp.
Merck & Co.
Tennessee Products & Chemicals Corp.
Dicyclopentadiene
Borden Co., Chemical Div.
Enjay Co.
Union Carbide Chemicals Co.
Di & Polybasic Acids
American Cyanamid Co. Plastics and Resin Div.
Emery Industries, Inc.
Hercules Powder Co.
Heyden-Newport Chemical Corp.
National Aniline Div., Allied Chemical Corp.
Chas. Pfizer & Co., Inc.
U. S. Industrial Chemicals Co. Div. of Nat'l Distillers and Chem. Corp.

Dodecenyl succinic Anhydrides
National Aniline Div., Allied Chemical Corp.
Fumaric Acid
T. F. McAdam, Inc.
National Aniline Div., Allied Chemical Corp.
Chas. Pfizer & Co., Inc.
Pittsburgh Coke & Chemical Co.
Plastics and Coal Chemicals Div., Allied Chemical Corp.
Hexahydrophthalic Anhydrides
National Aniline Div., Allied Chemical Corp.
Isophthalic Acid
Amoco Chemicals Corp.
Oronite Chemical Co.
Maleic Acid
National Aniline Div., Allied Chemical Corp.
Maleic Anhydrides
American Cyanamid Co., Plastics and Resins Div.
T. F. McAdam, Inc.
National Aniline Div., Allied Chemical Corp.
Oronite Chemical Co.
Pittsburgh Coke & Chemical Co.
Plastics and Coal Chemicals Div. Allied Chemical Corp.
Reichhold Chemicals, Inc.
Union Carbide Chemicals Co.
Naphthenic Acid
Enjay Co.
Gulf Oil Corp.
Naftone, Inc.
Oronite Chemical Co.
Pelargonic Acid
Emery Industries, Inc.
Sindar Corp.
Phthalic Anhydride
American Cyanamid Co., Plastics and Resins Div.
Amoco Chemicals Corp.
Fallek Products Co., Inc.
Koppers Co., Inc., Tar Products Div.
T. F. McAdam, Inc.
National Aniline Div., Allied Chemical Corp.
Oronite Chemical Co.
Plastics & Coal Chemicals Div., Allied Chemical Corp.
Pittsburgh Coke & Chemical Co.
Reichhold Chemicals, Inc.
Sherwin-Williams Co., Pigment, Color and Chemical Div.
Witco Chemical Co., Inc.
Pyromellitic Anhydride and Acid
E. I. du Pont de Nemours & Co.
Succinic Anhydride
National Aniline Div., Allied Chemical Corp.
Chas. Pfizer & Co., Inc.
Teraphthalic Acid
Oronite Chemical Co.
Tetrachlorophthalic Anhydride
Hooker Chemical Co.
Tetrahydrophthalic Anhydrides and Acids
E. I. du Pont de Nemours & Co.
National Aniline Div., Allied Chemical & Dye Corp.
Trimellitic Anhydride
Amoco Chemicals Corp.

Polyols

Butanediol
Antara Chemicals, Sales Div. of General Aniline & Film Corp.
Celanese Chemical Corp. a Div. of Celanese Corp. of America
Union Carbide Chemicals Co.
Glycerine
Armour Industrial Chemical Co.
Central Solvents & Chemicals Co.
Dow Chemical Co.
E. F. Drew
Glycerine Corp. of America
A. Gross & Co.
Lever Bros.
T. F. McAdam, Inc.
Reichhold Chemicals, Inc.
Shell Chemical Corp.
Solvents & Chemical Group
Swift & Co.
Western Solvents & Chemicals Co.
Woburn Chemical Corp.
Pentaerythritols (Di & Tri)
Celanese Chemical Co., A Div. of Celanese Corp. of America
Commercial Solvents Co.
Hercules Powder Co.
Heyden-Newport Chemical Corp.
T. F. McAdam, Inc.
Reichhold Chemicals, Inc.
Trojan Powder Co.
Polyhydroxy Resin
Dow Chemical Co.
Sorbitol
Atlas Powder Co.
Merck & Co. Chemical Div.
Trimethylolethane
Heyden-Newport Chemical Corp.
Trojan Powder Co.
Trimethylolpropane
Heyden-Newport Chemical Corp.
Trojan Powder Co.

Miscellaneous

Acrylic Acid
E. I. du Pont de Nemours Co.
B. F. Goodrich Chemical Co.
Rohm & Haas
Alpha Methylstyrene
Dow Chemical
Hercules Powder Co.
Plastics & Coal Chemicals Div. Allied Chemical Corp.
Benzoguanamine
Tennessee Products & Chemical Corp.
Bisphenol A
Dow Chemical Co.
Shell Chemical Corp.
Caprolactam
National Aniline Div. Allied Chemical Corp.
Crotonic Acid
Eastman Chemical Products
Diethyl Aniline
National Aniline Div. Allied Chemical Corp.
Divinylbenzene
Dow Chemical Co.
Koppers Co.
Epichlorohydrin
Dow Chemical Co.
Shell Chemical Corp.
Union Carbide Chemicals Co.
Epoxy Co-Reactants
Archer-Daniels-Midland Co.
Baker Castor Oil Co.
Dow Chemical Co.
E. I. du Pont de Nemours & Co.
General Mills, Chemical Div.
Reichhold Chemicals, Inc.
Formaldehyde
American Cyanamid Co., Industrial Chemical Div.
Borden Chemical Co.
R. J. Brown Co.
Celanese Chemical Company, Div. of Celanese Corp. of America
Commercial Solvents Corp.
E. I. du Pont de Nemours, Electrochemicals Dept.
Hercules Powder Co.
Heyden-Newport Chemical Corp.
Nitrogen Div., Allied Chemical Corp.
Olin Mathieson Chemical Corp.
Reichhold Chemicals, Inc.
Gilsonite
G. S. Ziegler & Co.
Glycols (Ethylene, etc.)
Antara Chemicals, a Sales Div. of General Aniline & Film Corp.
R. J. Brown Co.
Celanese Chemical Co., Div. of Celanese Corp. of America
Central Solvents & Chemical Co.
Chemical Solvents, Inc.
Dow Chemical Co.
E. I. du Pont de Nemours & Co., Inc.
Eastman Chemical Products Co.
Enjay Co., Inc.
Mercury Chemical Corp.
Nitrogen Div., Allied Chemical Corp.
Olin Mathieson Chemical Corp.
Plastics & Coal Chemicals Div., Allied Chemical Corp.
Solvents & Chemicals Group
Union Carbide Chemicals Co.
Western Solvents & Chemicals Co.
Wyandotte Chemicals Corp.
Hexamethylenetetramine
Borden Chemical Co.
E. I. du Pont de Nemours & Co. Electrochemicals Dept.
Heyden-Newport Chemical Corp.
Olin Mathieson Chemical Corp.
Reichhold Chemicals, Inc.
Isocyanates
Carwin Chemical Co.
E. I. du Pont de Nemours, Elastomer Chemicals Dept.
Mobay
National Aniline Div. Allied Chemical Corp.
Naugatuck Chemical Div. U. S. Rubber Co.
Isocyanates Co-Reactors
Baker Castor Oil Co.
m-Phenylenediamine
National Aniline Div. Allied Chemical Corp.

Methyl Esters
Fallek Products Co., Inc.
General Mills, Inc. Chemical Div.
Hercules Powder Co.
Nopco Chemical Co.
Stepon Chemical Co.
Western Solvents & Chemicals Co.

Methyl Gluoside
Corn Products Refining Co.

Napthol AS
National Aniline Div. Allied Chemical Corp.

Organic
Eastman Chemical Products
Mercury Chemical Corp.
Olin Mathieson Chemical Corp.
Penna. Ind. Chem. Corp.
Pfister Chemical Works
Pentanoic Acid
S. C. Johnson & Son, Inc.

p-tert-Butylphenol
Stepan Chemical Co.

Phenols
American Cyanamid Co., Organic Chemical Div.
Dow Chemical Co.
Eastman Chemical Products
Hercules Powder Co.
Koppers Co.
Oronite Chemical Co.
Pittsburgh Coke & Chemical Co.
Plastics & Coal Chemicals Div. Allied Chemical Corp.
Reichhold Chemicals, Inc.

Resorcinol
Borden Chemical Co.
Heyden-Newport Chemical Corp.
Koppers Co.
Reichhold Chemicals, Inc.
Sindar Corp.
Union Carbide Chemicals Co.

Silicone Intermediates
Dow Corning Corp.
General Electric, Silicone Products Dept.
Union Carbide Corp. Silicone Div.

Styrene Monomer
R. J. Brown Co.
Cosden Petroleum Corp.
Dow Chemical Co.
Koppers Co.
Shell Chemical Corp.
Union Carbide Chemicals Co.

Tar Bases & Acids
Koppers Co.
T. F. McAdam, Inc.
Pittsburgh Coke & Chemical Co.
Plastics & Coal Chemical Div., Allied Chemical Corp.

Ureas
American Cyanamid Co. Plastics and Resins Div.
Borden Chemical Co.
Central Solvents & Chemical Co.
E. I. du Pont de Nemours & Co.
Grace Chemical Co. Div. of W. R. Grace & Co.
Nitrogen Div. Allied Chemical Corp.
Reichhold Chemicals, Inc.
Sohio Chemical Co.

Vinyltoluene
Dow Chemical Co.

Rosin & Terpene Chemicals
Archer-Daniels-Midland Co.
Arizona Chemical Co.
Aromatic Products, Inc.
Godfrey L. Cabot
Central Solvents and Chemical Co.
Crosby Chemical Co.
Dixie Pine Products
Glidden Co.
Hercules Powder Co.
T.F. McAdam, Inc.
Rosin & Terpene Chemicals
Newport Industries Co. A Div. of Heyden-Newport Chemical Co.
Penna. Chem. Ind. Corp.
Reichhold Chemicals, Inc.
Solvents & Chemicals Group
Southern Naval Stores
Western Solvents & Chemicals Co.
G. S. Ziegler & Co.
Zophar Mills

LATEX EMULSIONS
6

Acrylic
American Cyanamid Co., Plastics and Resins Div.
Celanese Chemical Co. Div. of Celanese Corp. of America
Colton Chemical Co. Div. Air Reduction Co., Inc.
Borden Chemical Co.
Dow Chemical Co.
Firestone Plastics Co.
H. B. Fuller Co.
B. F. Goodrich Chemical Co.
Jersey State Chemical Co.
Monsanto Chemical Co., Plastics Div.
National Starch & Chemical Corp.
Reichhold Chemical, Inc.
Rohm & Haas
Stein, Hall & Co., Inc.
U. S. Coating Co.
Union Bay State Chemical Co.
Wica Chemicals, Inc.

Epoxy Ester Emulsion
Jones-Dabney Co.

Interpolymer Type
Celanese Chemical Co. Div. of Celanese Corp. of America
Colton Chemical Co. Div. Air Reduction Co., Inc.
Dow Chemical Co.
H. B. Fuller Co.
General Tire & Rubber Co. Chemical Div.
B. F. Goodrich Chemical Co.
U. S. Coatings Co.
Monsanto Chemical Co., Plastics Div.
National Starch & Chemical Corp.

Latex Base
Borden Chemical Co.
Dow Chemical Co.
E. I. du Pont de Nemours & Co.
Farac Oil & Chemical Co.
Naftone, Inc.
Naugatuck Chemical Div., U. S. Rubber Co.
U. S. Coatings Co.

Nitrile Latex
Naugatuck Chemical Div. U. S. Rubber Co.

Polystyrene Emulsions
Borden Chemical Co.
Dow Chemical Co.
Goodyear Tire & Rubber Co., Chemical Div.
Koppers Co. Inc., Chemical Div.
Monsanto Chemical Co., Plastics Div.
Union Bay State Chemical Co.
Union Carbide Plastics Co.
Western Solvents & Chemicals Co.

Polyvinyl Acetate Emulsions
Alkydol Laboratories, Div. of Reichhold Chemical Inc.
American Alkyd Industries
Borden Chemical Co.
Calvert-Mount Winans
Celanese Chemical Co. Div. of Celanese Corp. of America
Colton Chemical Co. Div. of Air Reduction Co. Inc.
H. B. Davis Co. Inc.
Dewey & Almy Chemicals, Div. of W. R. Grace Co.
E. I. du Pont de Nemours & Co. Electrochemicals Dept.
Farnow, Inc.
H. B. Fuller Co.
B. F. Goodrich Chemical Co.
Jersey State Chemical Co.
Jones-Dabney Co.
McCloskey Varnish Co.
McWhorter Chemicals, Inc.
Morningstar-Paisley, Inc.
National Starch & Chemical Corp.
Reichhold Chemicals, Inc.
Shawinigan Resins Corp.
Stein, Hall & Co., Inc.
Union Carbide Plastics Co.
U. S. Coatings Co.
R. T. Vanderbilt Co.
T. F. Washburn Co.
Wica Chemicals, Inc.

Polyvinyl Chloride Copolymers
Firestone Plastics Co.
B. F. Goodrich Chemical Co.

Styrene-Butadiene
Borden Chemical Co.
Dewey & Almy Chemicals Div. W. R. Grace & Co.
Dow Chemical Co.
Firestone Plastics Co.
General Tire & Rubber Co., Inc. Chemical Div.
B. F. Goodrich Chemical Co.
Goodyear Tire & Rubber Co., Inc. Chemical Div.
Koppers Co. Inc. Chemical Div.
Marbon Chemical Div. of Borg-Warner Corp.
Naugatuck Chemical Div. U. S. Rubber Co.
Union Bay State Chemical Co.

U. S. Rubber Co. Naugatuck Chemical Div.
Wica Chemicals, Inc.

Synthetic Types

California Ink Co., Inc.
Farnow, Inc.
B. F. Goodrich Chemical Co.
Goodyear Tire & Rubber Co., Chemical Div.
Monsanto Chemical Co., Plastics Div.
National Starch & Chemical Corp.
Naugatuck Chemical Div. U. S. Rubber Co.
Stein, Hall & Co., Inc.
Velsicol Chemical Corp.

Vinyl-Acrylic

National Starch & Chemical Corp.
Union Carbide Plastics Co.

Vinyl-Acrylic-Alkyd

Archer-Daniels-Midland Co.
Dow Chemical Co.
E. I. du Pont de Nemours, Elastomer Chemicals Dept.

Vinylidene Chloride

Borden Chemical Co.
Dow Chemical Co.
National Starch & Chemical Corp.

Miscellaneous Types

Alkydol Laboratories, Inc.
Archer-Daniels-Midland Co.
Cargill, Inc.
General Tire & Rubber Co., Chemical Div.
B. F. Goodrich Chemical Co.
Jersey State Chemical Co.
Pennsylvania Industrial Chemicals Corp.
Velsicol Chemical Corp.

PIGMENTS
7

Whites

American Cyanamid Co., Pigment Div.
American Zinc Sales Co.
Godfrey L. Cabot, Inc.
Carbola Chemical Co. Inc.
Chemical & Pigment Co.
E. I. du Pont de Nemours & Co.
Eagle-Picher Co.
Glidden Co.
H. Kohnstamm & Co., Inc.
National Lead Co.
New Jersey Zinc Co.
St. Joseph Lead Co.
Sherwin-Williams Co., Pigment, Color & Chemical Div.
Smith Chemical and Color Co., Inc.
Titanium Pigment Corp.
R. T. Vanderbilt Co.
Witco Chemical Co.

Blacks

Acheson Colloids Co.
Godfrey L. Cabot ,Inc.
Carbon Dispersions, Inc.
Columbian Carbon Co.
General Carbon Co.
Harshaw Chemical Co.
J. M. Huber Corp.
H. Kohnstamm & Co., Inc.
Mineral Pigments Corp.
Monsanto Chemical Co., Inorganic Chemicals Div.
Reichard-Coulston, Inc.
Sid Richardson Carbon Co.
Smith Chemical and Color, Co., Inc.
J. Lee Smith & Co.
United Carbon Co.
R. T. Vanderbilt Co.
C. K. Williams & Co.
Whittaker Clark & Daniels, Inc.
Witco Chemical Co.

Inorganic Types

Blues

American Cyanamid Co., Pigment Div.
The California Ink Co., Inc.
E. I. du Pont de Nemours & Co.
Eagle-Picher Co.
J. S. and W. R. Eakins, Inc.
Harshaw Chemical Co.
Imperial Paper & Color Corp.
Kentucky Color & Chemical Co.
H. Kohnstamm & Co., Inc.
Mineral Pigments Corp.
Reichhold Chemicals, Inc.
The Shepherd Chemical Co.
Smith Chemical and Color Co., Inc.
Standard Ultramarine & Color Co.
United Ultramarine & Chemical Co., Inc.

Browns & Tans

Berkshire Chemicals, Inc.
Columbian Carbon Co.
E. I. du Pont de Nemours & Co.
Hilton-Davis Chemical Co.
Kentucky Color & Chemical, Inc.
H. Kohnstamm, & Co., Inc.
Mineral Pigments Corp.
Reichard-Coulston, Inc.
The Shepherd Chemical Co.
Smith Chemical & Color Co.
J. Lee Smith & Co.
Wittacker, Clark & Daniels, Inc.
C. K. Williams & Co.

Greens

American Cyanamid Co., Pigment Div.
The California Ink Company, Inc.
E. I. du Pont de Nemours & Co.
J. S. and W. R. Eakins, Inc.
Harshaw Chemical Co.
Hilton-Davis Chemical Co.
Imperial Paper & Color Corp.
United Ultramarine and Chemical Co., Inc.
Kentucky Color & Chemical Co.
Mineral Pigment Corp.
Reichhold Chemicals, Inc.
The Shepherd Chemical Co.
Sherwin-Williams Co., Pigment, Color & Chemical Div.
Smith Chemical & Color Co.
Standard Ultramarine & Color Co.
Whittaker, Clark & Daniels, Inc.
C. K. Williams & Co.

Oranges

American Cyanamid Co., Pigment Div.
American Metal Climax
The California Ink Company, Inc.
Columbian Carbon Co.
E. I. du Pont de Nemours & Co.
Columbian Carbon Co.
J. S. and W. R. Eakins Co.,
Harshaw Chemical Co.
Hilton-Davis Chemical Co.
Imperial Paper & Color Corp.
Kentucky Color & Chemical Co.
H. Kohnstamm, & Co., Inc.
Mineral Pigments Corp.
Reichard-Coulston, Inc.
Reichhold Chemicals, Inc.
The Shepherd Chemical Co.
Sherwin-Williams Co., Pigment, Color & Chemical Div.
Smith Chemical and Color, Inc.
Whittaker, Clark and Daniels, Inc.
C. K. Williams & Co.

Red & Maroons

Columbian Carbon Co.
E. I. du Pont de Nemours & Co.
Eagle-Picher Co.
Glidden Co.
Hilton-Davis Chemical Co.
Imperial Paper & Color Corp.
Kentucky Color & Chemical Co.
H. Kohnstamm & Co., Inc.
Mineral Pigments Corp.
Reichard-Coulston, Inc.
The Shepherd Chemical Co.
Smith Chemical & Color Co.
J. Lee Smith & Co.
United Ultramarine & Chemical Co., Inc.
Whittaker, Clark & Daniels, Inc.
C. K. Williams & Co.

Yellows

American Cyanamid Co., Pigment Div.
The California Ink Company, Inc.
Columbian Carbon Co.
E. I. du Pont de Nemours & Co.
J. S. and W. R. Eakins Co.
Glidden Co.
Harshaw Chemical Co.
Hilton-Davis Chemical Co.
Imperial Paper & Color Corp.
Kentucky Color & Chemical Co
H. Kohnstamm Co., Inc.
Mineral Pigments Corp.
Reichard-Coulston, Inc.
Reichhold Chemicals, Inc.
The Shepherd Chemical Co.
Sherwin-Williams Co., Pigment, Color & Chemical Div.
Smith Chemical & Color Co.
J. Lee Smith & Co.
Whittaker, Clark & Daniels, Inc.
C. K. Williams & Co.

Organic Types

Blues

American Cyanamid Co., Pigment Div.
Ansbacher-Siegle Corp.
The California Ink Company, Inc.
E. I. du Pont de Nemours & Co.
J. S. & W. E. Eakins, Inc.
Federal Color Laboratories, Inc.
General Dyestuff Co., a Sales Div. of General Aniline & Film Corp.
Harmon Colors, National Aniline Div., Allied Chemical Corp.

Harshaw Chemical Co.
Hilton-Davis Chemical Co.
Holland Color and Chemical Co.
Imperial Paper & Color Corp.
Kentucky Color & Chemical Co.
H. Kohnstamm & Co., Inc.
Mineral Pigments Corp.
Pittsburgh Coke & Chemical Co.
Sandoz, Inc.
Shepherd Chemical Co.
Sherwin-Williams Co., Pigment, Color & Chemical Div.
Standard Ultramarine & Color Co.
Whittaker, Clark & Daniels, Inc.

Browns & Tans
American Cyanamid Co., Pigment Div.
Ansbacher-Siegle Corp.
E. I. du Pont de Nemours & Co.
J. S. & W. E. Eakins, Inc.
General Dyestuff Co., a Sales Div. of General Aniline & Film Corp.
Harmon Colors, National Aniline Div., Allied Chemical Corp.
Harshaw Chemical Co.
Hilton-Davis Chemical Co.
Interchemical Corp., Color and Chemicals Div.
Kentucky Color and Chemical Co.
H. Kohnstamm & Co., Inc.
Sandoz, Inc.
Sherwin-Williams Co., Pigment, Color and Chemical Div.

Greens
American Cyanamid Co., Pigment Div.
Ansbacher-Siegle Corp.
The California Ink Company, Inc.
E. I. du Pont de Nemours & Co.
J. S. & W. E. Eakins, Inc.
Federal Color Laboratories, Inc.
General Dyestuff Co., a Sales Div., General Aniline & Film Corp.
Harmon Colors, National Aniline Div., Allied Chemical Corp.
Harshaw Chemical Co.
Hilton-Davis Chemical Co.
Holland Color and Chemical Co.
Imperial Paper & Color Corp.
Kentucky Color & Chemical Co.
H. Kohnstamm & Co., Inc.
Pittsburgh Coke & Chemical Co.
Sandoz, Inc.
Shepherd Chemical Co.
Sherwin-Williams Co., Pigment, Color & Chemical Div.
Standard Ultramarine & Color Co.
Whittaker, Clark & Daniels, Inc.

Oranges
American Cyanamid Co., Pigment Div.
Ansbacher-Siegle Corp.
The California Ink Company, Inc.
E. I. du Pont de Nemours & Co.
J. S. & W. E. Eakins, Inc.
General Dyestuff Co., a Sales Div. General Aniline & Film Corp.
Harmon Colors, National Aniline Div., Allied Chemical Corp.
Harshaw Chemical Co.
Hilton-Davis Chemical Co.
Holland Color and Chemical Co.
Imperial Paper & Color Corp.
Interchemical Corp., Color and Chemicals Div.
Kentucky Color & Chemical Co.
H. Kohnstamm & Co., Inc.
Sandoz, Inc.
Sherwin-Williams Co., Pigment, Color and Chemical Div.
Standard Ultramarine & Color Co.

Reds & Maroons
American Cyanamid Co., Pigment Div.
Ansbacher-Siegle Corp.
The California Ink Company, Inc.
R. E. Carroll, Inc.
E. I. du Pont de Nemours & Co.
J. S. & W. E. Eakins, Inc.
Federal Color Laboratories, Inc.
General Dyestuff Co., a Sales Div., General Aniline & Film Corp.
Harmon Colors National Aniline Div., Allied Chemical Corp.
Harshaw Chemical Co.
Hilton-Davis Chemical Co.
Holland Color and Chemical Co.
Imperial Paper & Color Corp.
Interchemical Corp., Color and Chemicals Div.
Kentucky Color & Chemical Co.
H. Kohnstamm & Co., Inc.
Mineral Pigments Corp.
Sandoz, Inc.
Shepherd Chemical Co.
Sherwin-Williams Co., Pigment, Color & Chemical Div.
Standard Ultramarine & Color Co.

Yellows
American Cyanamid Co., Pigment Div.
Ansbacher-Siegle Corp.
The California Ink Company, Inc.
E. I. du Pont de Nemours & Co.
J. S. & W. E. Eakins, Inc.
Federal Color Laboratories, Inc.
General Dyestuff Co., A Sales Div., General Aniline & Film Corp.
Harmon Colors National Aniline Div., Allied Chemical Corp.
Harshaw Chemical Co.
Hilton-Davis Chemical Co.
Holland Color and Chemical Co.
Imperial Paper & Color Corp.
Interchemical Corp., Color and Chemicals Div.
Kentucky Color & Chemical Co.
H. Kohnstamm & Co., Inc.
Sandoz, Inc.
Shepherd Chemical Co.
Sherwin-Williams Co., Pigment Color and Chemical Div.
Standard Ultramarine & Color Co.

Lakes & Toners
American Cyanamid Co., Pigment Div.
Ansbacher-Siegle Corp.
The California Ink Company, Inc.
Collway Colors, Inc.
E. I. du Pont de Nemours & Co.
J. S. & W. E. Eakins, Inc.
General Dyestuff Co., a Sales Div. General Aniline & Film Corp.
Harmon Colors National Aniline Div., Allied Chemical Corp.
Harshaw Chemical Co.
Hilton-Davis Chemical Co.
Imperial Paper & Color Corp.
Kentucky Color & Chemical Co.
H. Kohnstamm & Co., Inc.
Magruder Color Co., Inc.
Pittsburgh Coke & Chemical Co.
Sandoz, Inc.
Sherwin-Williams Co., Pigment, Color & Chemical Div.
Standard Ultramarine & Color Co.
Whittaker, Clark & Daniels, Inc.

Cuprous Oxide
C. K. Williams & Co.

Dispersions
Acheson-Colloids Co.
American Cyanamid Co., Pigment Div.
Ansbacher-Siegle Corp.
California Ink Co., Inc.
Carbon Dispersions, Inc.
Claremont Dispersion
Columbian Carbon Co.
J. S. & W. R. Eakins, Inc.
General Dyestuff Co., a Sales Div. of General Aniline and Film Corp.
Goodyear Tire & Rubber Co., Inc., Chemical Div.
Harmon Colors, National Aniline Div., Allied Chemical Corp.
Harshaw Chemical Co.
Harwick Standard Chemical Co.
Hilton-Davis Chemical Co.
Holland Color and Chemical Co.
Imperial Paper & Color Corp.
Interchemical Corp., Color and Chemicals Div.
Kentucky Color & Chemical Co.
H. Kohnstamm & Co., Inc.
Kromall Chemical & Dispersions Corp.
Pennsylvania Color & Chemical Co.
Sandoz, Inc.
Sheffield Bronze Paint Corp.
Sherwin-Williams Co., Pigment, Color & Chemical Div.
J. Lee Smith & Co.
Thibaut & Walker Co., Inc.
Whittaker, Clark & Daniels, Inc

Metallic
Aluminum Pastes & Powders
Aluminum Co. of America
Central Solvents and Chemical Co.
E. I. du Pont de Nemours & Co.
Magna Mfg. Co.
Metalead Products Corp.
Metals Disintegrating Co.
Reynolds Metals Co.
Silberline Manufacturing Co., Inc
U. S. Bronze Powder Wks.
Bronze Powders
Aluminum Co. of America
E. I. du Pont de Nemours & Co.
Glidden Co.
Magna Mfg. Co.
Metals Disintegrating Co.
U. S. Bronze Powder Wks.
Green Gold Type
E. I. du Pont de Nemours & Co.
Metals Disintegrating Company

Iron Flake
Metals Disintegrating Co.
Lead Paste & Powders
Metalead Products Corp.

Nickel Flake
Metals Disintegrating Co.
Silver Flake
Metals Disintegrating Co.
Stainless Steel
Charles J. Hardy, Inc.
Metals Disintegrating Co.
Tin Flake
Metals Disintegrating Co.
Zinc Dust
American Zinc Sales Co.
Metals Disintegrating Company
New Jersey Zinc Co.

Non-Toxic Colorants
Columbian Carbon Co.
Kentucky Color and Chemical Co.
H. Kohnstamm & Co., Inc.
Sherwin-Williams, Pigment, Color and Chemical Div.
Synthetic Chemicals, Inc.
Whittaker, Clark & Daniels, Inc.

Titanium Dioxide
American Cyanamid Co., Pigments Div.
E. I. duPont de Nemours & Co., Inc., Pigments Dept.
Glidden Co., Chemicals-Pigments-Metals Div.
New Jersey Zinc Co.
Titanium Pigment Corp.
R. T. Vanderbilt

Lead Pigments
White Lead
Eagle-Picher Co.
Hammond Lead Products, Inc.
National Lead Co.
Sublimed Blue Lead
Eagle-Picher Co.
Red Lead
Eagle-Picher Co.
Hammond Lead Products, Inc.
National Lead Co.
Litharge
Eagle-Picher Co.
Hammond Lead Products, Inc.
National Lead Co.
Orange Mineral
Eagle-Picher Co.
National Lead Co.
Lead Silicates
Eagle-Picher Co.
Hammond Lead Products, Inc.
National Lead Co.
Basic Lead Silico Chromate
Eagle-Picher Co.

Zinc Pigments
Zinc Oxides
American Zinc Sales Co.
Bunker Hill Co.
Eagle-Picher Co.
New Jersey Zinc Co.
St. Joseph Lead Co.
Sherwin-Williams Co., Pigment, Color & Chemical Div.

Extenders & Fillers
Berkshire Chemicals, Inc.
Godfrey L. Cabot, Inc.
Carbola Chemical Co., Inc.
R. E. Carroll, Inc.
Chemical & Pigment Co.
Concord Mica Corp.
De Lore Div., National Lead Co.
Desert Minerals, Inc.
Diamond Alkali Co.
Dicalite Dept., Great Lakes Carbon Corp.
Eagle-Picher Co.
English Mica Co.
Franklin Mineral Products Co.
Georgia Kaolin Co.
Georgia Marble Co., Calcium Products Div.
Hayden Mica Co.
J. M. Huber Corp.
International Talc Co., Inc.
H. Kohnstamm & Co., Inc.
Johns-Manville
Merck Marine Magnesium Div.
Minerals & Chemicals Corp. of America
Sherwin-Williams Co., Pigment, Color and Chemical Div.
Smith Chemical & Color Co., Inc.
Southern California Minerals Co.
Southern Clays, Inc.
Tamms Industries, Inc.
R. T. Vanderbilt Co.
Whittaker, Clark & Daniels, Inc.
C. K. Williams & Co.
Witco Chemical Co.
Wyandotte Chemicals Corp.

Fluorescent
General Dyestuff Co., a Sales Div. General Aniline & Film Corp.
Imperial Paper & Color Co.
Radiant Color Co.
Synthetic Chemicals, Inc.

Flush Colors
American Cyanamid, Pigment Div.
Ansbacher-Siegle Corp.
Federal Color Laboratories, Inc.
General Dyestuff Co., a Sales Div. General Aniline & Film Corp.
Harwick Standard Chemical Co.
Hilton-Davis Chemical Co.
Holland Color & Chemical Co.
Sherwin-Williams Co., Pigment, Color and Chemical Div.
Standard Ultramarine & Color Co.
Whittaker, Clark & Daniels, Inc.

Pearl Essence
Mearl Corp.
Rhodia Inc.
Rona Laboratories, Inc.

Preservative Pigment
Buckman Laboratories, Inc.

Umbers and Siennas
Hilton-Davis Chemical Co.
Kentucky Color & Chemical Co.
H. Kohnstamm & Co., Inc.
Mineral Pigments Corp.
Smith Chemical & Color Co.
J. Lee Smith & Co., Inc.
Reichard-Coulston Inc.
Whittaker, Clark & Daniels, Inc.
C. K. Williams & Co.

Universal Colorants
Craftint Mfg. Co.

PLASTICIZERS
8

Acme Shellac Products Co.
Advance Solvents & Chemical Div. of Carlisle Chemical Works, Inc.
Archer-Daniels-Midland Co.
Armour Chemical Div., Armour & Co.
Baker Castor Oil Co.
R. J. Brown Co.
Cambridge Industries Co., Inc.
Celanese Chemical Co. a Div. of Celanese Corp. of America
Central Solvents and Chemical Co.
Colton Chemical Co., Div. of Air Reduction Co., Inc.
Columbian Carbon Co.
Commercial Solvents Corp.
Dehydag, Deutsche Hydrierwerke GmBH
Dewey and Abney Chemical Div., W. R. Grace & Co.
E. F. Drew & Co.
Eastman Chemical Products, Inc.
Emery Industries, Inc.
Food Machinery & Chemical Corp., Chemical Plastics Div.
Foremost Good & Chemical Co.
B. F. Goodrich Chemical Co.
Harchem Div., Wallace & Tiernan Co.
Harwick Standard Chemical Co.
Hercules Powder Co.
Mercury Chemical Corp.
Ohio-Apex Div., Food Machinery & Chemical Corp.
M. W. Parsons-Plymouth, Inc.
Chas. Pfizer & Co., Inc.
Pittsburgh Coke & Chemical Co.
Plastics & Coal Chemicals, Div. of Allied Chemical Corp.
Sherwin-Williams Co., Pigment, Color and Chemical Div.
Solvents and Chemicals Group
Tennessee Products & Chemical Corp.
Union Carbide Chemical Co.
Witco Chemical Co.

RESINS
9

Acrylics
American Alkyd Industries
American Cyanamid Co., Plastics and Resins Div.
Borden Co., Chemical Div.
The California Ink Company, Inc.
Catalin Corp. of America
Dow Chemical Co.
E. I. du Pont de Nemours and Co.
General Aniline & Film Corp.
B. F. Goodrich Chemical Co.
Jersey State Chemical Co.
Plastics & Coal Chemicals Div. Allied Chemical Corp.
Reichhold Chemicals, Inc.
Rohm & Haas Co.
Sherwin-Williams Co., Pigment, Color and Chemical Div.

Alkyds

Adco Chemical Co.
Alkydol Laboratories, Div. of Reichhold Chemicals, Inc.
American Cyanamid Co., Plastics & Resin Div.
American Alkyd Industries
Archer-Daniels-Midland Co.
Basic Varnish & Research Corp.
California Ink Co., Inc.
Cambridge Industries Co.
Cargill, Inc.
Crosby Chemicals
Crownoil Chemical Co.
H. B. Davis Co., Inc.
Degen Oil Chemical Co.
Farac Oil & Chemical Co.
Farnow, Inc.
France, Campbell and Darling, Inc.
Freeman Chemical Corp.
Haynie Products, Inc.
Hercules Powder Co.
Hilton-Davis Chemical Co.
Jones-Dabney Co.
Lawter Chemicals, Inc.
McCloskey Varnish Co.
McWhorter Chemicals, Inc.
Midwest Synthetics Co.
Plastics and Coal Chemical Div., Allied Chemical Corp.
Price Varnish Co.
Reichhold Chemicals, Inc.
Rohm & Haas Co.
Schenectady Varnish Co.
Sherwin-Williams Co., Pigment, Color and Chemical Div.
Specialty Resin Co.
Fred'k A. Stresen-Reuter Inc.
Synvar Corp.
Thibaut & Walker Co., Inc.
U. S. Coatings Co.
T. F. Washburn Co.

Alkylated Phenol

Neville Chemical Company

Allylics

Food Machinery & Chemical Corp., Chemicals and Plastics Div.

Cellulosics

Dow Chemical Co.
E. I. du Pont de Nemours & Co.
Eastman Chemical Products, Inc.
Hercules Powder Co.
Horn, Jeffrys Co.

Chlorinated Rubber

Hercules Powder Co.
Naftone, Inc.

Copal Type

Lawter Chemicals, Inc.

Coumarone-Indene

Neville Chemical Co.
Plastics and Coal Chemical Div., Allied Chemical Corp.
Pennsylvania Industrial Chemical Corp.
Price Varnish Co.
Velsicol Chemical Corp.

Cyclized Rubber

Alkydol Laboratories, Div. of Reichhold Chemicals, Inc.
Goodyear Tire & Rubber Co., Inc.
Naftone, Inc.
Reichhold Chemicals, Inc.

Cyclopentadiene

Archer-Daniels-Midland Co.
Enjay Co., Inc.
R-B-H Dispersions, Div. of Interchemical Corp.

Epoxy

Alkydol Laboratories, Div. of Reichhold Chemicals Inc.
Borden Chemical Co.
Ciba Products Corp.
Dow Chemical Co.
Food Machinery & Chemical Corp. Chemicals and Plastics Div.
Jones-Dabney Co.
Pittsburgh Coke and Chemical Co.
Reichhold Chemicals, Inc.
Schenectady Varnish Co.
Shell Chemical Corp.
Sherwin-Williams Co.
Union Carbide Plastics Co.

Epoxy Esters

Alkydol Labs., Div. of Reichhold Chemicals, Inc.
Archer-Daniels-Midland Co.
Borden Chemical Co.
Celanese Chemical Co., A Div. of Celanese Corp. of America
Crownoil Chemical Co., Inc.
H. B. Davis Co.
Degen Oil & Chemical Co.
Farnow, Inc.
France, Campbell and Darling, Inc.
Freeman Chemical Corp.
Jones-Dabney Co.
McCloskey Varnish Co.
Midwest Synthetics Co.
Plastics & Coal Chemicals Div. Allied Chemical Corp.
Reichhold Chemicals, Inc.
Sherwin-Williams Co., Pigment, Color and Chemical Div.
Fred'k Stresen-Reuter, Inc.
U. S. Coatings Co.
T. F. Washburn Co.

Ester Gum Solutions

Alkydol Laboratories, Div. of Reichhold Chemicals, Inc.
American Alkyd Industries
Archer-Daniels-Midland Co.
The California Ink Company, Inc.
Crosby Chemicals, Inc.
H. B. Davis Co.
Glidden Co.
McCloskey Varnish Co.
C. J. Osborn Co.
Pine Chemicals, Inc.
Plastics & Coal Chemicals Div. Allied Chemical Corp.
Reichhold Chemicals, Inc.
Sherwin-Williams Co., Pigment Color and Chemical Div.
Synvar Corp.
U. S. Coatings Co.

Fumaric

Alkydol Labs., Div. of Reichhold Chemicals, Inc.
Archer-Daniels-Midland Co.
California Ink Co., Inc.
Crownoil Chemical Co., Inc.
The California Ink Co., Inc.
Farac Oil & Chemical Co.
Filtered Rosin Products, Inc.
France, Campbell and Darling, Inc
Glidden Co.
Hercules Powder Co.
Lawter Chemicals, Inc.
C. J. Osburn & Co.
Plastics & Coal Chemicals Div., Allied Chemical Corp.
Reichhold Chemicals, Inc.
Rohm & Haas Co.
Schenectady Resins
Sherwin-Williams Co., Pigment, Color and Chemical Div.
Fred'k Stresen-Reuter, Inc.

Hydrocarbons

Allied, Asphalt & Mineral Corp.
American Gilsonite Co.
Amoco Chemicals Corp.
R. J. Brown Co.
Cosden Petroleum Corp.
Dow Chemical Co.
Koppers Co., Tar Products Div.
Neville Chemical Co.
Pennsylvania Industrial Chemical Corp.
R-B-H Dispersions, Div. of Interchemical Corp.
U. S. Industrial Chemicals, Div. of Nat'l Distillers and Chem. Corp.
Velsicol Chemical Corp.

Isocyanates

The California Ink Company, Inc.
Cargill, Inc.
The Carwin Company
E. I. du Pont de Nemours & Co.
Freeman Chemical Corp.
Mobay Chemical Co.
National Aniline Div., Allied Chemical Corp.
Naugatuck Chemical Div. U. S. Rubber Co.

Ketone Formaldehyde

Lawter Chemicals, Inc.

Melamines

American Cyanamid Co., Plastics & Resins Div.
Catalin Corp. of America
Monsanto Chemical Co. Plastics, Div.
Plastics and Coal Chemical Div., Allied Chemical Corp.
Reichhold Chemicals, Inc.
Rohm & Haas Co.
Sherwin-Williams Co., Pigment, Color and Chemical Div.

Maleics

Alkydol Laboratories, Div. of Reichhold Chemicals, Inc.
American Alkyd Industries

Archer-Daniels-Midland Co.
The California Ink Company, Inc.
Central Solvents and Chemical Co.
Crosby Chemicals, Inc.
Crownoil Chemical Co.
Farac Oil and Chemical Co.
Farnow, Inc.
France, Campbell and Darling
Glidden Co.
Hercules Powder Co.
Jones-Dabney Co.
Lawter Chemicals, Inc.
Naugatuck Chemical Div., U. S. Rubber Co.
C. J. Osborne Co.
Plastics and Coal Chemical Div., Allied Chemical Corp.
Reichhold Chemicals, Inc.
Rohm & Haas Co.
Schenectady Varnish Co.
Sherwin-Williams Co. Pigment Color and Chemical Div.
Fred'k Stressen-Reuter, Inc.

Natural Resins

Acme Shellac Products Co.
American Gilsonite Co.
Archer-Daniels-Midland Co.
Central Solvents and Chemical Co.
Gillespie-Rogers-Pyatt Co., Inc.
Haeuser Shellac Co.
Hercules-Powder Co.
Heyden-Newport Chemical Corp.
O. G. Innes Corp.
Internatio-Rotterdam Inc.
The Mantrose Corp.
Reichhold Chemicals, Inc.
Thibaut Chemicals, Inc.
William Zinsser & Co.

Nitrocellulose Solutions

Cellofilm Industries, Inc.
Hercules Powder Co.
Horn, Jefferys Co.
Sherwin-Williams Co., Pigment, Color and Chemical Div.

Phenolics

Alkydol Laboratories, Div. of Reichhold Chemicals, Inc.
American Cyanamid Co., Plastics & Resins Div.
Archer-Daniels-Midland Co.
Borden Chemical Co.
Catalin Corp. of America
H. B. Davis Co.
Farnow, Inc.
General Electric Co., Chemical Materials Dept.
Glidden Co.
Hercules Powder Co.
Hooker Chemical Co.
Krumbhaar Chemicals, Inc.
Lawter Chemicals, Inc.
Monsanto Chemical Co., Plastics Div.
Plastics & Coal Chemicals Div., Allied Chemical Corp.
Reichhold Chemicals, Inc.
Rohm & Haas Co.
Schenectady Varnish Co.
Sherwin-Williams Co., Pigment, Color and Chemical Div.
Synvar Corp.
Union Carbide Plastics Co.
Varcum Chemical Corp.

Phenol Modified Coumarone-Indene

Neville Chemical Company

Polyamides

Borden Chemical Co.
E. I. du Pont de Nemours & Co.
General Mills, Inc., Chemical Div.
Olin Mathieson Chemical Corp.

Polybutenes

Advance Solvents & Chemical Div. of Carlisle Chemical Works, Inc.
Amoco Chemicals Corp.
Cosden Petroleum Corp.
Naftone, Inc.
Phillips Petroleum Co.

Polyesters

Alkydol Laboratories, Div. of Reichhold Chemicals, Inc.
American Alkyd Industries
American Cyanamid Co., Plastics & Resins Div.
Archer-Daniels-Midland Co.
The California Ink Company, Inc.
E. I. du Pont de Nemours & Co.
France, Campbell and Darling, Inc.
Freeman Chemical Corp.
General Tire and Rubber Co., Chemical Div.
Hercules Powder Co.
Hooker Chemical Co.
Mobay Chemical Co.
Naftone, Inc.
Naugatuck Chemical Div., U. S. Rubber Co.
Pastics and Coal Chemical Div., Allied Chemical Corp.
Reichhold Chemicals, Inc.
Rohm & Haas Co.
Schenectady Varnish Co.
Sherwin-Williams Co., Pigment, Color and Chemical Div.
Specialty Resins Co.
Union Carbide Plastics Co.
Witco Chemical Co., Inc.

Polystyrenes

The California Ink Company, Inc.
Cosden Petroleum Corp.
Dow Chemical Co.
Koppers Co.
Monsanto Chemical Co., Plastics Div.
Pennsylvania Industrial Chemical Corp.
Union Carbide Plastics Co.

Polyurethanes

Baker Castor Oil Co.
California Ink Company, Inc.
Cargill, Inc.
E. I. du Pont de Nemours, Co.,
Farnow, Inc.
Freeman Chemical Corp.
General Tire & Rubber Co., Chemical Div.
B. F. Goodrich Chemical Co.
Gulf Oil Corp., Petrochemicals Sales Office
Mobay Chemical Co.
National Aniline Div. Allied Chemical Corp.
Naugatuck Chemical Div. U. S. Rubber Co.
Plastics & Coal Chemical Div. Allied Chemical Corp.
Spencer Kellogg and Sons, Inc.
U. S. Coatings Co.
Witco Chemical Co., Inc.

Silicones

Dow Corning Corp.
General Electric Co. Silicones Products Dept.
Plastics & Coal Chemicals Div. Allied Chemical Corp.
Silicone Div. Union Carbide Corp.

Styrene Copolymers

California Ink Co., Inc.
Degen Oil & Chemical Co.
Dewey & Almy Chemicals, Div. of W. R. Grace & Co.
Dow Chemical Co.
B. F. Goodrich Chemical Co.
Goodyear Tire and Rubber Co., Chemical Div.
Koppers Co.
Marbon Chemical Div. of Borg-Warner Corp.
Monsanto Chemical Co. Plastics Div.
Penna. Ind. Chem. Corp.
Reichhold Chemicals, Inc.
Sherwin-Williams Co., Pigment, Color and Chemical Div.
Union Carbide Plastics Co.
Velsicol Chemical Corp.

Synthetic Rubber

E. I. du Pont de Nemours & Co., Elastomers Div.
General Tire and Rubber Co., Chemical Div.

Terpenes

Central Solvents and Chemical Co.
Crosby Chemical Co.
Glidden Co.
Hercules Powder Co.
Pennsylvania Industrial Chemical Corp.
Schenectady Varnish Co.

Thixotropic Vehicles

Alkydol Laboratories, Div. of Reichhold Chemicals, Inc.
Jones-Dabney Co.
Spencer-Kellogg & Sons, Inc.
Reichhold Chemicals, Inc.
Fred'k Stresen-Reuter, Inc.
T. F. Washburn Co.

Universal Vehicles

Farnow, Inc.

Ureas

American Cyanamid Co., Plastics & Resins Dept.
Borden Chemical Co.

Catalin Corp. of America
Central Solvents and Chemical Co.
Jones-Dabney Co.
Monsanto Chemical Co., Plastics Div.
Onyx Chemical Corp.
Plastics and Coal Chemical Div., Allied Chemical Corp.
Reichhold Chemicals, Inc.
Sherwin-Williams Co., Pigment, Color, and Chemical Div.
Rohm & Haas Co.
Sherwin-Williams Co.

Vinyls

Borden Co., Chemical Div.
The California Ink Company, Inc.
Colton Chemical Co.
Diamond Alkali Co.
Dow Chemical Co.
E. I. du Pont de Nemours & Co., Electrochemicals Dept.
General Aniline & Film Corp.
General Tire and Rubber Co., Chemical Div.
B. F. Goodrich Chemical Co.
Goodyear Tire & Rubber Co., Inc.
Monsanto Chemical Co., Plastics Div.
Reichhold Chemicals, Inc.
Union Carbide Plastics Co.

Vinyl Acetate Solutions

Alkydol Laboratories, Div. of Reichhold Chemicals, Inc.
Borden Chemical Co.
Cellofilm Industries, Inc.
E. I. du Pont de Nemours, Electrochemicals Dept.
Firestone Plastics Co.
Onyx Chemical Corp.
Reichhold Chemicals, Inc.
Shawinigan Resins Corp.
Sherwin-Williams Co., Pigment, Color and Chemical Div.

Vinyltoluene Copolymers

Degen Oil & Chemical Co.
Spencer Kellogg & Sons, Inc.
Union Carbide Plastics Co.

Water Thinned Resins

Alkydol Labs., Div. of Reichhold Chemicals, Inc.
American Cyanamid Co., Plastics and Resins Div.
Archer-Daniels-Midland Co.
Borden Chemical Co.
Catalin Corp. of America
Cargill, Inc.
Dewey and Almy Chemical, Div., W. R. Grace & Co.
E. I. du Pont de Nemours, Electrochemicals Dept.
Farac Oil and Chemical Co.
Farnow, Inc.
B. F. Goodrich Chemical Co.
Hercules Powder Co.
Key Chemicals Corp.
Monsanto Chemical Co., Plastics Div.
Reichhold Chemicals, Inc.
Rohm & Haas Co.
U. S. Coatings Co.
T. F. Washburn Co.

SOLVENTS
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Alicyclic

National Aniline Div., Allied Chemical Corp.

Aliphatics

American Mineral Spirits Co.
Anderson-Prichard Oil Corp.
Antara Chemicals, Sales Div. of General Aniline & Film Corp.
R. J. Brown Co.
Celanese Chemical Co., Div. Celanese Corp. of America
Central Solvents & Chemicals Co.
Chemical Solvents, Inc.
Continental Oil Co.
Dow Chemical Co.
E. I. du Pont de Nemours & Co.
Eastern States Chemical Corp.
Horn, Jefferys Co.
Mercury Chemical Corp.
National Aniline Div. of Allied Chemical Corp.
Olin Mathieson Chemical Corp.
Pennsalt Chemical Corp.
Penola Oil Co.
Phillips Petroleum Co.
Shell Oil Co.
Sinclair Petrochemicals, Inc.
Skelly Oil Co.
Socony Mobil Oil Co., Inc.
Solvay Process Div., Allied Chemical Corp.
Solvents and Chemicals Group
Standard Oil Co. of Ohio
U. S. Industrial Chemicals Co., Div. of Nat'l Distillers & Chem. Corp.
Western Solvents & Chemicals Co.

Aromatics

American Mineral Spirits Co.
Amoco Chemicals Corp.
Antara Chemicals, a Sales Div. of General Aniline & Film Corp.
Atlantic Refining Co.
R. J. Brown Co.
Central Solvents and Chemical Co.
Cosden Petroleum Corp.
Dow Chemical Co.
E. I. du Pont de Nemours & Co.
Eastern States Chemical Corp.
Enjay Co., Inc.
Esso Standard Oil Co.
Horn, Jefferys Co.
Inland Steel Co.
Mercury Chemical Corp.
Neville Chemical Co.
Penola Oil Co.
Pittsburgh Coke & Chemical Co.
Phillips Petroleum Co.
Plastics and Coal Chemical Div., Allied Chemical Corp.
Shell Oil Co.
Sinclair Petrochemicals, Inc.
Skelly Oil Co.
Solvents and Chemicals Group
Standard Oil Co. of Ohio
Sun Oil Co.
Tennessee Products & Chemicals Corp.
United States Steel Corp.
Vickers Petroleum Co.
Western Solvents & Chemicals Co.

Halogen-Containing

R. J. Brown Co.
Central Solvents and Chemical Co.
Columbia-Southern Chemical Corp.
Dow Chemical Co.
E. I. du Pont de Nemours & Co., Electrochemicals Dept.
Hooker Chemical Co.
Kolker Chemical Corp.
Olin Mathieson Chemical Corp.
Solvay Process Div., Allied Chemical Corp.
Solvents and Chemicals Group
U. S. Industrial Chemicals Co., Div. of Nat'l Distillers and Chemical Corp.

Naphthas

American Mineral Spirits Co.
Anderson Prichard Oil Corp.
R. J. Brown Co.
Central Solvents and Chemical Co.
Chemical Solvents, Inc.
Eastern States Chemical Corp.
Esso Standard Oil Co.
Horn, Jefferys Co.
Inland Steel Co.
Neville Chemical Co.
Penola Oil Co.
Phillips Petroleum Co.
Pittsburgh Coke & Chemical Co.
Plastics & Coal Chemicals Div., Allied Chemical Corp.
Shell Oil Co.
Sinclair Petrochemicals, Inc.
Skelly Oil Co.
Socony Mobil Oil Co., Inc.
Solvents & Chemicals Group
Standard Oil Co. of Ohio
Vickers Petroleum Co.
Western Solvents & Chemicals Co.

Nitroparaffins

Commercial Solvents Corp.
Western Solvents & Chemicals Co.

Odorless and Low-Odor Solvents

American Mineral Spirits Co.
Anderson-Prichard Oil Corp.
Central Solvents and Chemical Co.
Chemical Solvents, Inc.
Cosden Petroleum Corp.
Eastern States Petroleum & Chemical Co.
Esso Standard Oil Co.
Mercury Chemical Corp.
Phillips Petroleum Co.
Shell Oil Co.
Sinclair Petrochemicals, Inc.
Skelly Oil Co.
Socony Mobil Oil Co., Inc.
Standard Oil Co. of Ohio
U. S. Industrial Chemicals Co., Div. of Nat'l Distillers and Chem. Corp.
Western Solvents & Chemicals Co.

Oxygen-Containing

Borden Chemical Co.
R. J. Brown Co.
Celanese Chemical Co., a Div. of Celanese Corp. of America
Central Solvents and Chemical Co.

Commercial Solvents Corp.
E. I. du Pont de Nemours & Co.
Dow Chemical Co.
Eastman Chemical Products, Inc.
Enjay Co., Inc.
Esso Standard Oil Co.
Hercules Powder Co.
Horn, Jefferys Co.
Mercury Chemical Corp.
National Aniline Div., Allied Chemical Corp.
Olin Mathieson Chemical Corp.
Pennsalt Manufacturing Co., Industrial Div.
Plastics and Coal Chemicals, Div. of Allied Chemical Corp.
Publicker Industries, Inc.
Solvents & Chemicals Group
Shell Chemical Corp.
U. S. Industrial Chemicals Co. Div. of Nat'l Distillers and Chem. Corp.
Union Carbide Chemical Co.

Turpentines
Arizona Chemical Co.
R. J. Brown Co.
Central Solvents and Chemical Co.
Crosby Chemicals, Inc.
Glidden Co.
Guignon & Green, Inc.
Hercules Powder Co.
Newport Industries Co., a Div. of Heyden Newport Chemical Co.
Sherwin-Williams Co., Pigment, Color and Chemical Div.
Solvents and Chemical Group
Southern States Chemical Co.
Western Solvents & Chemicals Co.

PRODUCTION EQUIPMENT 11

Azeotropic Systems
Brighton Corp.
Blaw-Knox Co., Buflovak Equipment Div.

Ball & Pebble Mills
Abbe Engineering Co.
Paul O. Abbe, Inc.
Baker Perkins
Coors Porcelain Co.
Epworth Mfg. Co.
Kinetic Dispersion Corp.
Machinery & Equipment Company Inc.
Patterson Foundry & Machine Co.
U. S. Stoneware Co.

Barrell Rollers
Abbe Engineering Co.
Paul O. Abbe, Inc.
Cleveland Mixer Co.
L. M. Gilbert Co.
U. S. Stoneware Co.
Terriss Div. Consolidated Syphon Supply Co.

Blenders
Abbe Engineering Co.
Paul O. Abbe, Inc.
B-I-F Industries, Inc.
Baker-Perkins, Inc., Chemical Machinery Div.
Bowser, Inc., Marketing Div.
Brighton Corp.
Cleveland Mixer Co.
J. H. Day Co., Div. of Cleveland Automatic Mach. Co.
Gifford-Wood Co.
Herman Hockmeyer & Co.
Kent Machine Works, Inc.
Kinetic Dispersion Corp.
J. M. Lehmann Co., Inc.
Machinery & Equipment Company, Inc.
Patterson Foundry & Machine Co.
Patterson-Kelley Co.
Read Standard Corp.
Rietz Mfg. Co.
Charles Ross & Son Co.
Terriss Div., Consolidated Siphon Supply Co.
Troy Div., Skinner Eng. Co.
U. S. Stoneware Co.

Burners and Burner Settings
Selas Corp. of America

Cleaning Tools and Machines
L. M. Gilbert Co.
Karl Kiefer Machine Co.
U. S. Air Tool Co.

Colloid Mills
Abbe Engineering Co.
Gifford-Wood Co.
Kinetic Dispersion Corp.
Machinery & Equipment Company Inc.
Manton-Gaulin Mfg. Co., Inc.
Morehouse-Cowles, Inc.
The Pfaudler Co.
Premier Mill Corp.
Chas. Ross & Son Co.
Tri-Homo Corp.
Troy Div., Skinner Eng. Co.
U. S. Stoneware Co.

Compressors
Beach Russ Co.

Carbon Dioxide
C. M. Kemp Mfg. Co.
General Dynamics Corp., Liquid Carbonic Div.

Coding Machines
Kiwi Coders Corp.
J. M. Lehmann Co.
James H. Matthews & Co.

Crushers, Choppers
Franklin P. Miller & Sons, Inc.

Cutters, Rotary
Abbe Engineering Co.

Delumpers
Franklin P. Miller & Sons, Inc.

Dissolvers
Abbe Engineering Co.
B.I.F. Industries, Marketing Div.
Baker-Perkins Inc., Chemical Machinery Div.
Brighton Corp.
Cleveland Mixer Co.
J. H. Day Co., Div. of Cleveland Automatic Mach. Co.
Epworth Mfg. Co., Inc.
Gifford-Wood Co.
Herman-Hockmeyer & Co.
Kent Machine Works
Kinetic Dispersion Corp.
Machinery & Equipment Company Inc.
Morehouse-Cowles, Inc.
Patterson Foundry & Machine Co.,
Premier Mill Corp.
Charles Ross & Son Co.
Terriss Div., Consolidated Siphon Supply Co.

Dowtherm Kettles
Brighton Corp.
Blaw-Knox Co., Buflovak Equipment Div.
Cleveland Mixer Co.
Machinery & Equipment Company Inc.
Patterson Foundry and Machine Co.
Process Eng. & Mach. Co.

Drum Reconditioners
L. M. Gilbert Co.

Drum Mixers
Abbe Engineering Co.
Cleveland Mixer Co.
J. H. Day Co., Div. of Cleveland Automatic Mach. Co.
Chas. Ross & Son Co.
Terriss Div., Consolidated Siphon Supply Co.
U. S. Stoneware Co.

Drum Rollers
Abbe Engineering Co.
Paul O. Abbe, Inc.
Cleveland Mixer Co.
L. M. Gilbert Co.
Terriss Div., Consolidated Siphon Supply Co.
U. S. Stoneware Co.

Drum Warmers
Harold L. Palmer Co.

Dust Removal Systems
B.I.F. Industries, Inc.
Machinery & Equipment Company, Inc.
Pangborn Corp.
Claude B. Schneible Co.
Wheelabrator Corp.

Feeders
B.I.F. Industries
Elgin Mfg. Co.

Filling Machines
C. M. Ambrose Co.
Bowser, Inc., Marketing Div.
Chisholm Ryder Co. of Penna.
Arthur Colton Co., Div. of Snyder Corp.
Filpaco Industries, Inc.
Karl Kiefer Machine Co.
Oil Equipment Laboratories, Inc.
Machinery & Equipment Company, Inc.
T. R. Mantes Company

Filters
American Felt Co.
Bowser, Inc., Marketing Div.
Cuno Engineering Corp.
Filpaco Industries, Inc.

Filter Fabrics Inc.
Hercules Filter Corp.
Sparkler Mfg. Co.
Terriss Div., Consolidated Siphon Supply Co.

Filtering Aids
Eagle-Picher Co.
Dicalite Div., Great Lakes Carbon Corp.
Hercules Filter Corp.
Johns-Manville Sales Corp.
Komline-Sanderson Eng. Corp.
Machinery & Equipment Company, Inc.
Sparkler Mfg. Co.
Star Tank & Filter Corp.

Filter Press
Biach Industries, Inc.
Filpaco Industries, Inc.
Hercules Filter Corp.
Machinery & Equipment Company, Inc.
Sparkler Mfg. Co.
Star Tank & Filter Corp.
Terriss Div., Consolidated Siphon Supply Co.

Fume Removal Systems
Brighton Corp.
Catalytic Combustion Corp.
Doyle Vacuum Cleaner Co.
Claude B. Schneible Co.
Schutte and Koerting Co.
U. S. Stoneware Co.

Gas Boosters
Beach-Russ Co.

Gaskets
American Felt Co.
Johns-Manville Corp.
U. S. Stoneware Co.

Grinding Media
Abbe Engineering Co.
Paul O. Abbe, Inc.
Coors Porcelain Co.
Diamonite Products Mfg. Co.
Epworth Mfg. Co.
Kent Machine Works, Inc.
LZP Industrial Ceramics Co.
McDanel Refractory Porcelain Co.
Patterson Foundry and Machine Co.
Porcelain Div. of Ferro Corp.
Pennebacker Co., Inc.
U. S. Stoneware Co.

Homogenizer
Manton-Gaulen Mfg. Co.

Inert Gas Generators
C. M. Kemp Mfg. Co.
General Dynamics Corp., Liquid Carbonic Div.
Machinery & Equipment Company, Inc.

Jar Rolling Machines
Abbe Engineering Co.
McDanel Refractory Porcelain Co.
Patterson Foundry and Machine Co.
Paul O. Abbe, Inc.
Terriss Div., Consolidated Siphon Supply Co.
U. S. Stoneware Co.

Labelling Machines
Chisholm-Ryder Co. of Pennsylvania
King Sales & Engineering Co.
Machinery & Equipment Company, Inc.

Laboratory Mills
J. H. Day Co., Div. of Cleveland Automatic Mach. Co.

Laboratory Jar Rolling Mills
Abbe Engineering Co.
Paul O. Abbe Co.
Epworth Mfg. Co., Inc.
McDanel Refractory Porcelain Co.
Patterson Foundry and Machine Co.
Chas. Ross & Son Co.
U. S. Stoneware Co.

Liquid Depth Indicators
Gulf Oil Corp., Petrochemicals Sales Office
Liquidometer Corp.
Petrometer Corp.

Meters
B.I.F. Industries
Bowser, Inc., Marketing Div.

Mill Head Assemblies
Abbe Engineering Co.
Epworth Mfg. Co., Inc.
Gulf Oil Corp., Petrochemicals Sales Office
Chas. Ross & Son Co.

Mill Jars
Abbe Engineering Co.
Paul O. Abbe Co.
Coors Porcelain Co.
Gulf Oil Corp., Petrochemicals Sales Office
McDanel Refractory Porcelain Co.
Patterson Foundry and Machine Co.
Porcelain Div., Ferro Corp.
U. S. Stoneware Co.

Mill Linings
Abbe Engineering Co.
Paul O. Abbe, Inc.
Diamonite Products Mfg. Co.
Gulf Oil Corp. Petrochemicals Sales Office
LZP Industrial Ceramics Co.
McDanel Refractory Porcelain Co.
Pennebacher Co., Inc.
Porcelain Div. Ferro Corp.
U. S. Stoneware Co.

Mixers & Agitators
Abbe Engineering Co.
Paul O. Abbe, Inc.
Baker Perkins, Inc., Chemical Machinery Div.
Blaw-Knox Co., Buflovak Equip. Div.,
Brighton Corp.
Brookfield Engineering Labs., Inc.
Chisholm Ryder Co. of Penna.
Cincinnati Hildebrand Co.
Cleveland Mixer Co.
J. H. Day Co., Div. Cleveland Automatic Machine Co.
Eastern Industries, Inc.
Epworth Mfg. Co.
Filpaco Industries, Inc.
Gifford-Wood Co.
Gulf Oil Corp., Petrochemicals Sales Office
Herman Hockmeyer & Co.
International Engineering Corp.
Jensen Engineering Co.
Kent Machine Works, Inc.
Kinetic Dispersion Corp.
J. M. Lehmann Co., Inc.
Machinery & Equipment Company Inc.
Mixing Equipment Co.
Neumann & Weaver, Inc.
Patterson Foundry & Machine Co.
Premier Mill Corp.
Read Standard Corp.
Rietz Mfg. Co.
Charles Ross & Son Co.
Star Tank & Filter Corp.
F. J. Stokes Corp.
Terriss Div., Consolidated Siphon Supply Co.
Troy Div., Skinner Eng. Co.
U. S. Stoneware Co.

Positive Displacement Meter
B-I-F Industries
Bowser, Inc., Marketing Div.
Gulf Oil Corp., Petrochemicals Sales Office

Pulverizers
Franklin P. Miller & Sons, Inc.

Pumps
Beach-Russ Co.
B-I-F Industries
Blackmer Pump Co.
Filpaco Industries, Inc.
Foster Pump Works, Inc.
Gulf Oil Corp., Petrochemicals Sales Office
Kamaline-Sanderson Eng. Corp.
Machinery & Equipment Company Inc.
Manton-Gaulin Manufacturing Co., Inc.
Neumann & Weaver, Inc.
Sparkler Mfg. Co.

Refractories (Heating)
Eagle-Picher Co.
Johns-Manville Corp.
Gulf Oil Corp., Petrochemicals Sales Office
Terriss Div., Consolidated Siphon Supply Co.
Wallace & Tiernan

Resin & Varnish Kettles
Blaw-Knox Co., Buflovak Equip. Div.
Brighton Corp.
Cleveland Mixer Co.
Filpaco Industries, Inc.
Gulf Oil Corp. Petrochemicals Sales Office
Machinery & Equipment Company, Inc.
Patterson Foundry & Machine Co.
Star Tank & Filter Corp.

Rollers for Barrels
Abbe Engineering Co.
Paul O. Abbe, Inc.
Gulf Oil Corp. Petrochemicals Sales Office
Terriss Div., Consolidated Siphon Supply Co.

Roller Mills
Abbe Engineering Co.
Buhler Bros.
Chemical & Pharmaceutical Industry Co., Inc.
J. H. Day Co., Div. of Cleveland Automatic Machine Co.
Gulf Oil Corp., Petrochemicals Sales Office
Kent Machine Works, Inc.

J. M. Lehmann Co., Inc.
Machinery & Equipment Company, Inc.
Charles Ross & Son Co.
Troy Div., Skinner Eng. Co.
U. S. Stoneware Co.

Safety Containers
Protectoseal Co.

Sieving & Screening Machines
Abbe Engineering Co.
J. H. Day Co., Div. Cleveland Automatic Machine Co.
Gulf Oil Corp., Petrochemicals Sales Office
J. M. Lehmann Co., Inc.
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FORECAST

Tremendous Sales Potential for Aerosol Paints!

Sales have increased 158% in just 2 years, yet present sales are just a drop in the paint bucket compared to potential!

During the last few years, the paint field has been experiencing the same kind of revolutionary sales impact that aerosol packaging has had on hair sprays, insecticides, shave creams and many other popular products. Last year, sales of aerosol paints to the "do-it-yourself" home market reached a total of 55 million cans valued at $71.5 million. This represents a spectacular increase over the 36.1 million units sold for $46.9 million in 1957 and the 21.3 million units sold for $27.7 million in 1956. And these spectacular sales increases appear to be just the beginning!

Areas of future growth

There are 3 distinct markets for aerosol coatings:

1. **The standard coating market (primarily cans of 1 pint or less)**
2. **New acrylic lacquers and resins**
3. **Specialty coatings**

First, let's look at the percentage of standard paint sales that aerosols can expect to command.

The standard coating market

Current yearly production of standard paints for home use is distributed in the following can sizes:

Can Size	Gallons Produced
¼ pint	171,200
½ pint	2,110,400
1 pint	9,868,800
1 quart	63,425,600
1 gallon	84,424,000
Total gallons	160,000,000

It is estimated that aerosol packaging could capture:

95% of ¼ and ½ pint can sales (2,167,520 gallons)
50% of 1 pint can sales (4,934,400 gallons)
5% of 1 quart cans (3,171,280 gallons)

This represents an additional 10,273,200 gallons, or approximately 187 million aerosol paint units. Added to existing aerosol sales of 55 million units, it would place the total potential market for standard aerosol house paints at 242 million units per year! And there's more!

Acrylic lacquers and resins

Although the standard paint market is the primary aerosol sales target, other areas are "naturals" for aerosols. For example, autos, bicycles, toys, metal cabinets and other products in the home are painted best by *spraying* acrylic resin paint or quick drying lacquers. Aerosol packaging opens these areas to the "do-it-yourselfer"—and, in this case, there is no unfavorable price comparison with non-aerosols.

Specialty coatings

Increasing demand for a variety of specialty coatings promises additional growth opportunities for aerosols. For example, multi-color speckled type paints in aerosols which can produce a stippled or textured finish represent a good possibility. Waterbased paint in aerosols may also find wide application for touch-up work and painting of small areas in the home.

How to "enter" the aerosol market

As one of America's leading suppliers of aerosol propellants, General Chemical offers many helpful services to present and prospective aerosol coating marketers. For example, we can show you promising new aerosol paint formulations developed in our "Genetron" laboratories . . . and can help you develop your *own* new aerosol formulation.

Contract fillers—We will also direct you to highly capable contract fillers, who can put up small runs for you or handle full-scale commercial production. These contract fillers will work with you from planning and testing through to volume filling. They can get you into the aerosol coating market quickly and efficiently—*without any outlay on your part for plant, special equipment or personnel!*

For further information—or if you would like to arrange for a special presentation on the aerosol coating market—write today to "Genetron," General Chemical Division, Allied Chemical Corporation.

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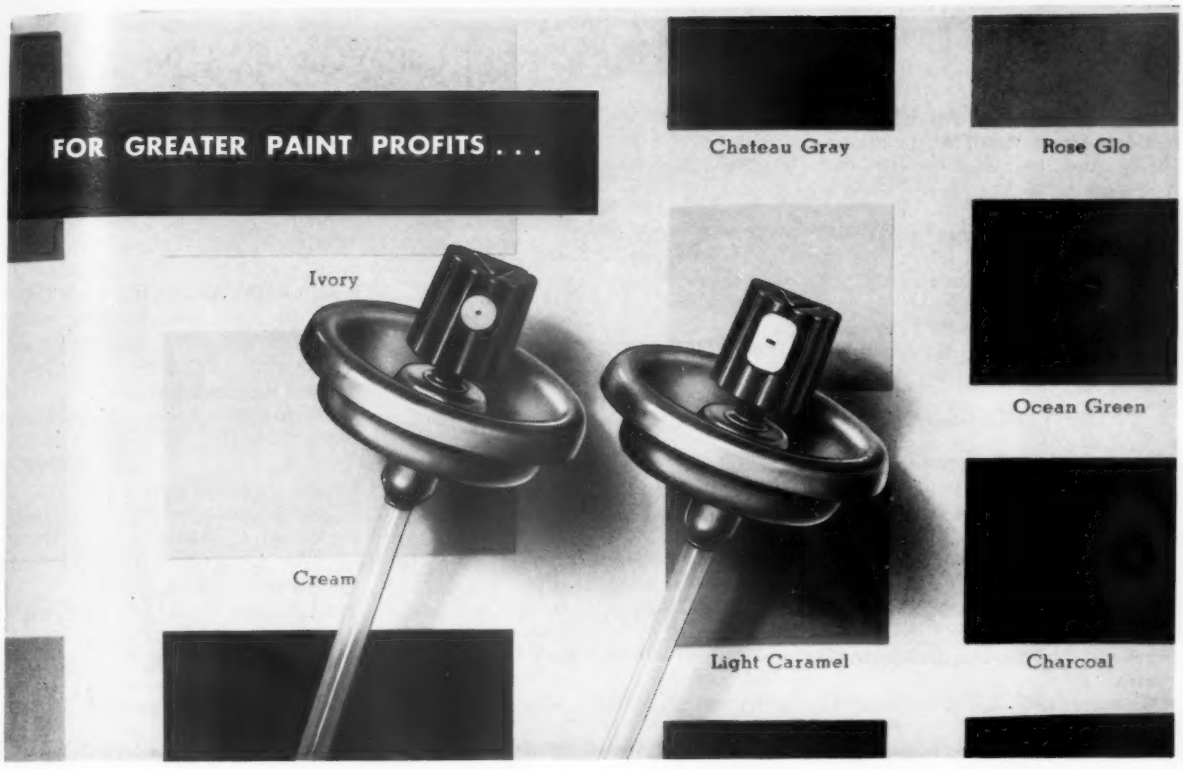

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G. E. Howkinson Co.
4 North Cicero Avenue
Chicago

SO. INDIANA
R. F. Kleinfeldt Co.
Box 27, Mt. Washington Sta.
Cincinnati, Ohio

IOWA
G. E. Howkinson Co.
4 North Cicero Avenue
Chicago, Illinois

KENTUCKY
R. F. Kleinfeldt Co.
Box 27, Mt. Washington Sta.
Cincinnati, Ohio

LOUISIANA
Bruce A. Wilson & Co.
P. O. Box 6243,
Houston, Texas

MINNESOTA
G. W. Howkinson Co.
4 North Cicero Avenue
Chicago, Illinois

MISSOURI
G. E. Howkinson Co.
4 North Cicero Avenue
Chicago, Illinois

OHIO
R. F. Kleinfeldt Co.
Box 27, Mt. Washington Sta.
Cincinnati 30
R. F. Kleinfeldt Co.
8905 Lake Avenue
Cleveland, 2

PENNSYLVANIA
R. F. Kleinfeldt Co.
P. O. Box 4937
E. Liberty Station
Pittsburgh

TEXAS
Bruce A. Wilson & Co.
P. O. Box 6243
Houston

WEST VIRGINIA
R. F. Kleinfeldt Co.
Box 27, Mt. Washington Sta.
Cincinnati, Ohio

WISCONSIN
G. E. Howkinson Co.
4 North Cicero Avenue
Chicago, Illinois

Acme Shellac Products Co.

ILLINOIS
Philip E. Calo Co., Inc.
333 N. Michigan Avenue
Chicago 1

MARYLAND
G. T. Wise & Company
1101-09 N. Payson St.
Baltimore

OHIO
Paul Wiemer Co.
2089 Sherman Avenue
Cincinnati

Advance Solvents & Chemical Division Carlisle Chemical Works, Inc.

CALIFORNIA
Pacific Coast Chem. Co.
2060 Third St.
Berkeley 10
Stay & Day Paint Materials Co.
363 South Mission Road
Los Angeles 33

GEORGIA
Charles L. Burks Co.
P. O. Box 54
East Point

ILLINOIS
Carl Lechner Incorporated
1791 W. Howard St.
Chicago 26

KENTUCKY
H. H. Benner Co.
Commonwealth Bldg. 446
Louisville 2

LOUISIANA
Lastrapes Bros.
322 Board of Trade Arcade
New Orleans 12

MARYLAND
A. B. Kohl Sales Co.
4615 Edmondson Ave.
Baltimore 29

MASSACHUSETTS
Barrett & Breen Co.
80 Federal St.
Boston 10
C. K. Mullin, Inc.
160 N. Washington St.
Boston 14

MICHIGAN
Matteson-Van Wey, Inc.
16901 West Eight Mile Road
Detroit 2

MINNESOTA
Horton Earl Co.
6127 Excelsior Blvd.
Minneapolis 1

MISSOURI
Mr. H. R. Hamberg
7273 Maryland Ave.
St. Louis 30

Morton Myers Co.
220 E. Missouri Ave.
Kansas City 6

NORTH CAROLINA
Charles L. Burks Co.
P. O. Box 1032
Black Mountain
Charles L. Burks
419 S. Hamilton St.
High Point

OHIO
Anderson & Co.
504 Delaware St.
Akron 3

OREGON
W. M. Gillies Inc.
621 S. W. Morrison St.
Portland 5

PENNSYLVANIA
Van Horn Metz & Co., Inc.
241 East Elm Street
Conshohocken
E. E. Zimmerman Co.
Keenan Building
Pittsburgh 22

TEXAS
Ja Ro Chemicals Co.
2551 Farrington St.
P. O. Box 10544
Dallas 7
Ja Ro Chemicals Co.
Robinson Public Warehouse Co.
2323 Buffalo Drive
P. O. Box 2532
Houston

Alkydol Laboratories, Inc.

CALIFORNIA, OREGON, WASHINGTON
Pacific Coast Chemicals Co.
2060 Third Street
Berkeley, California

MICHIGAN
G. B. Horsfull
1353 Whittier Road
Grosse Pointe 30

NEW YORK, NEW JERSEY, EASTERN PENNSYLVANIA
W. R. Husen Company
125 Woodland Avenue
East Orange, New Jersey

OHIO
C. L. Zimmerman Company
N-303 Cincinnati Uunion Terminal
Cincinnati 3

WESTERN PENNSYLVANIA, EASTERN OHIO
Harwood J. Cranston
R. D. .2, Box 48A
Sewickley, Pennsylvania

American Felt Company

CALIFORNIA
A. B. Boyd Company
763 East 14th Street
Los Angeles 21

A. B. Boyd Company
1235 Howard Street
San Francisco 3

GEORGIA
Marcus A. Cook
305 Techwood Drive, N. W.
Atlanta

MISSOURI
Hayne-Surridge Co., Inc.
1901 Pine Street
St. Louis 3

NEW YORK
William B. Thaney
82 St. Paul Street
Rochester 4

OREGON
A. B. Boyd Co.
930 S. E. Oak St.
Portland 14

SOUTH CAROLINA
Louis P. Batson
1707 Augusta Street
Greenville

TEXAS
David Lowman
3209 McKinney Street
Dallas 2

WASHINGTON
A. B. Boyd Co.
418 Boren North
Seattle 9

Anderson-Prichard Oil Corp.

CALIFORNIA
Paul W. Wood Company
2600 South Eastern Ave.
Los Angeles 22
Paul W. Wood Company
350 Townsend Street
San Francisco 7

MASSACHUSETTS
Raw Materials Company
140 Federal Street
Boston 10

Archer-Daniels-Midland Company

INDIANA
Indiana Naval Stores
401 West 17 Street

MARYLAND
A B Kohl Sales Company
4615 Edmondson Avenue

KENTUCKY
Lewis & Company
102 West Main Street

Griffith-Mehaffey, Inc.
604 S. Front Street

MICHIGAN
Krekel-Goetz Sales & Supply
302-303 Houseman Bldg.

MINNESOTA
ADM Minneapolis
700 Investors Bldg.
Minneapolis 40

NEW YORK
ADM New York
1600 Trade Bldg., 225 B'dway
New York 7

OREGON
Van Waters & Rogers
3950 NW Yeon Avenue

PENNSYLVANIA
Joseph A. Burns & Son
124 Harrison Avenue

TEXAS
Southwest Sales Company, Inc.
P. O. Box 9275

TENNESSEE
The Lilly Company
466 Union Avenue

WASHINGTON
Van Waters & Rogers
4000 First Avenue South

Van Waters & Rogers
North 809 Washington Street

Arizona Chemical Company

CALIFORNIA
A. J. Lynch & Company
2424 Blanding Street
Alameda
A. J. Lynch & Company
4560 East 50 Street
Los Angeles 58

GEORGIA
Whitaker Oil Company
1557 Marietta Road Southwest
Atlanta 10

ILLINOIS
Farac Oil & Chemical Company
145 Street & Indiana Avenue
Chicago 27

KENTUCKY
M. J. Daly Company
38 Elm Street
Ludlow

LOUISIANA
Thompson-Hayward Chemical Company
P. O. Box 4068 Station F (7700 Earhart Blvd.)
New Orleans 18

MASSACHUSETTS
N. S. Wilson & Sons
150 Causway Street
Boston 14

MICHIGAN
Geore E. Moser & Son, Inc.
2961 Penobscot Building
Detroit 26

MINNESOTA
Purity Soap & Chemical Co.
500 2nd St., S. E.,
Minneapolis 14

NEW YORK
Welch, Holme & Clark Co., Inc.
1 Hudson Street
New York 13

OHIO
Donald McKay Smith, Inc.
550 Henna Building
Cleveland 15

OREGON
Great Western Chemical Company
3720 N. W. Yeon Ave.
Portland

PENNSYLVANIA
T. G. Cooper & Company, Inc.
Cedar and Venango St.
Philadelphia 34

TEXAS
Van Waters & Rogers, Inc.
Drawer 1891 (10216 Denton Road)
Dallas 9
Thompson-Hayward Chemical Company
P. O. Box 4557 (1701 Oliver St.)
Houston 13

WASHINGTON
Great Western Chemical Company
6900 Fox Ave.
Seattle 8
West 1133 College Ave.
Spokane 1

CANADA
Charles Albert Smith Ltd.
8307 Royden Road
Montreal 9, Quebec

Charles Albert Smith Ltd.
356 Eastern Avenue
Toronto 8, Ontario

Aromatic Products

CALIFORNIA
W. G. Stidston

FLORIDA
Glenn Kingham
P. O. Box 4575
Ft. Lauderdale

ILLINOIS
George R. Wood
205 W. Wacker Drive

MASSACHUSETTS
F. G. McNamara
West Newton

PENNSYLVANIA
Lee W. Campbell
40 E. Main St.
Carnegie, Pa.

TENNESSEE
Sol Kaplan
L. E. Offutt Co.
P. O. Box 8063

TEXAS
Paul M. Wagner
4025 Glenwick Lane

The Baker Castor Oil Company

CALIFORNIA
Paul W. Wood Company
350 Townsend Street
San Francisco 7

COLORADO
Application Engineers, Inc.,
2150 S. Bellaire
Denver 22

GEORGIA
G. R. Nottingham Co.
1257 Chattahoochee Ave. NW
Atlanta

KENTUCKY
H. H. Benner Company
803 Hoffman Building
Louisville 2

MARYLAND
William McGill
237 President Street
Baltimore 2

MICHIGAN
Krekel Goetz Sales & Supply Co.
302 Houseman Building
Grand Rapids 2
D. H. Osgood Company
4181 Oakman Blvd.
Detroit 4

MINNESOTA
Thompson-Hayward Chemical Co.
909 Second Street, South
Minneapolis 15

MISSOURI
H. A. Baumstark & Co.
6801 Hoffman Avenue
St. Louis 9
Thompson-Hayward Chemical Co.
2915 Southwest Blvd.
Kansas City

OHIO
National Lead Company
1776 Columbus Road
Cleveland 13
C. L. Zimmerman Co.
N-303 Union Terminal
Cincinnati 3

OKLAHOMA
Thompson-Hayward Chemical Co.
3909 S. Meridian Ave.
P. O. Box 1008, Southwest Station
Oklahoma City
Thompson-Hayward Chem. Co.
36 N. Guthrie Street
Tulsa 3

OREGON
W. M. Gillies, Inc.
American Bank Building
621 S. W. Morrison
Portland 5

PENNSYLVANIA
E. W. Kaufmann
P. O. Box 27
Flourtown
E. E. Zimmerman Co.
Keenan Building
Pittsburgh 22

TEXAS
Thompson-Hayward Chem. Co.
2627 Weir St.
P. O. Box 6226
Dallas
Thompson-Hayward Chem. Co.
P. O. Box 4557
1701 Oliver St.
Houston 13

WASHINGTON
W. R. Benson, Inc.
820 First Avenue, South
Seattle 4

CANADA
Turpentine & Rosin Prod., Corp.
1801 St. Patrick St.
Montreal, Quebec
Turpentine & Rosin Prod. Corp.
17 Riber Street
Toronto, Ontario

Bowser, Inc.

ARIZONA
R. L. Baird
2404 North 16th Street
Phoenix

CALIFORNIA
E. M. Kuhl
5711 Sheila Street
Los Angeles 22
C. P. Stoddard
468 Ninth Street
San Francisco 3
E. M. Kuhl
190 Commercial Street
Sunnyvale

GEORGIA
M. M. Springer
741 Boulevard N. E.
Atlanta 5

ILLINOIS
R. A. Bland
1303 W. Randolph Street
Chicago 7

MASSACHUSETTS
K. E. Paulus
25 Southwest Park
Westwood

MICHIGAN
K. D. Lawless
17217 Wyoming
Detroit 21

MINNESOTA
C. V. Schoonmaker
1016 Second Avenue S.
Minneapolis 2

MISSOURI
R. A. Herron
1320 W. 39th Street
Kansas City 2

NEW YORK
H. K. Woodward
420 Lexington Avenue
New York 17
R. D. Courtright
420 Lexington Avenue
New York 17

OHIO
C. J. Egger
4209 W. 150th Street
Cleveland 35

PENNSYLVANIA
K. E. Simminger
225 W. Lehigh
Philadelphia 33
L. J. Suelzer
544-548 Oliver Building
Pittsburgh

TEXAS
J. F. German
1706 Hinton Street
Dallas
6406 Long Drive
Houston 17

WASHINGTON
K. L. Kuebler
2227 Fifth Avenue
Seattle 1

Buhler Brothers, Inc.

CALIFORNIA
Hans Zogg
1715 Juarez Avenue
Los Altos

ILLINOIS
Erik Wulf
314 Duane Street
Glen Ellyn

LOUISIANA
Arthur Kunz
10200 Pressburg Street
New Orlean

Godfrey L. Cabot, Inc.

COLORADO
Braun-Knecht-Heimann Co.
2301 Blake Street
Denver 17

FLORIDA
Palmer Supplies Company of Florida
211 E. Robinson Avenue
Orlando

GEORGIA
Deeks and Company
186 Rio Circle
Decatur
George E. Missbach & Co.
Henry Grady Building
Atlanta 3

LOUISIANA
The Breffeilh Company
P. O. Box 13222
New Orleans 25

MASSACHUSETTS
D. H. Litter Company
291 North Harvard Street
Allston 34
Raw Materials Company
140 Federal Street
Boston 10

MICHIGAN
Matteson-Van Wey, Inc.
16901 West Eight Mile Road
Detroit 35

MISSOURI
Ivan T. Bauman Company
817 North Second Street
St. Louis 2
Morton-Myers Company
220 East Missouri Avenue
Kansas City 6

NEW YORK
Commercial Chemicals, Inc.
211 Hertel Avenue
Buffalo 7
36 Winthrop Street
Rochester 7
D. H. Litter Company
114 East 16th Street
New York 3

NEW YORK (con't)
Raw Materials Company
220 East 42nd Street
New York 17

NORTH CAROLINA
Deeks and Company
P. O. Box 565
High Point

OHIO
Henry L. Grund, Inc.
406 Bulkley Building
Cleveland 15
Theodore C. Kiesel
P. O. Box 93
Cincinnati 13

OREGON
Van Waters & Rogers, Inc.
3950 N. W. Yeon Avenue
Portland 10

PENNSYLVANIA
John D. Butts
926 Grant Building
Pittsburgh 19

TEXAS
Van Waters & Rogers, Inc.
P. O. Box 1188
Dallas 9
5403 Kirby Drive
Houston 5

UTAH
Braun-Knecht-Heimann Co.
650 West 8th South
Salt Lake City

WASHINGTON
Van Waters & Rogers, Inc.
4000 First Avenue South
Seattle 4
North 809 Washington
Spokane 1

CANADA
Van Waters & Rogers, Ltd.
2623 Skeena Street
Vancouver 12

The California Ink Company, Inc.

FLORIDA
A. J. Passonno
107 22nd. Belleair Beach
Indian Rocks

GEORGIA
R. C. Fromant
186 Rio Circle
Decatur

ILLINOIS
J. W. Van Tuin Co.
5844 Lincoln Ave.
Chicago 45

MASSACHUSETTS
Hobart Gillespie
864 Humprey St.
Swampscott

MINNESOTA
M. H. Baker Co.
1645 Hennepin Ave.
Minneapolis

NEW YORK
D. B. Becker Co.
150 Nassau St.
New York 38

NORTH CAROLINA
Bill Rupp
H.P.T. & D. Railroad Bldg.
High Point

OHIO
Deeks & Co.
6433 Wiehe Road
Golf Manor
Cincinnati

Dimlich-Radcliffe Co.
13125 Shaker Sq.
Cleveland

OREGON
John C. Robinson
7637 S. E. 31st Ave.
Portland

WASHINGTON
W. Ronald Benson, Inc.
820 First Ave. So.
Seattle

Carbon Dispersions, Inc.

CALIFORNIA
E. S. Browning Co.
2321 Yates Ave.
Los Angeles 22

CALIFORNIA (cont'd)
E. S. Browning Co.
1515 Third St.
San Francisco 7

COLORADO
E. C. Stone Co.
136 West 12th Ave.
Denver 4

FLORIDA
Palmer Supplies Co. of Fla.
P. O. Box 784
Orlando

GEORGIA
Deeks & Co.
186 Rio Circle
Decatur

ILLINOIS
Donald R. Fritzgerald
5875 N. Lincoln Ave.
Chicago 45

KENTUCKY
C. L. McGuire & Co.
137 St. Matthews Ave.
Louisville 7

LOUISIANA
Thompson-Hayward Chemical Co.
3111 Lowerline Ave.
New Orleans

MASSACHUSETTS
Lukens Chemical Co.
227 California St.
Newton 58

MISSOURI
Ack Sales Company
901 East 13th Ave.
North Kansas City 16
Thompson-Hayward Chemical Co.
5 Carr St.
St. Louis

NEW YORK
C. Withington Co.
47-40 5th Street
Long Island City 1

F. F. Salamon Co.
Castle Heights Ave.
Box 309
Nyack

Arthur Somers
11 Ormond Street
Rockville Centre

NORTH CAROLINA
Deeks & Co.
P. O. Box 565
High Point

OHIO
The Paul Wiemer Co.
2089 Sherman Ave.
Cincinnati 12

Ducros & Co.
3592 Lee Road
Shaker Heights 20

PENNSYLVANIA
A. C. Hurlbrink
3701 N. Broad St.
Philadelphia

J. C. Ackerman Co.
Penn Lincoln Hotel
Pittsburgh 21

TEXAS
JaRo-Chem
P. O. Box 10544

Dallas 7
2202 Nance St.
Houston 10

Cellofilm Industries, Inc.

ILLINOIS
G. R. O'Shea Company
858 Diversey Pkway
Chicago 14

MICHIGAN
D. H. Osgood Co.
4181 Oakman Blvd.
Detroit 4

OHIO
Donald McKay Smith, Inc.
550 Hanna Bldg.
Cleveland 15

PENNSYLVANIA
E. E. Zimmerman Co.
Keenan Bldg.
Pittsburgh 22

SOUTH CAROLINA
Moreland Chemical Co.
Drawer 2437
Spartanburg

Chisholm-Ryder Company of Pennsylvania

ARKASAS
Leon C. Osborn Co., Inc.
3520 S. Boston, P. O. Box 45
Fort Smith

CALIFORNIA
King Sales & Engineering Co.
441 Folsom St.
San Francisco 5
King Sales & Engineering Co.
6214 W. Manchester Ave., Room 6
Los Angeles 44
Watts King Company
3404 N. Figueroa St.
Los Angeles 65

COLORADO
DeLine Associates
224 West Alameda Avenue
Denver 9

FLORIDA
Food Equipment & Supply Co., Inc.
1809 2nd Ave.
Tampa 1
Stiles Conveyors & Transmissions, Inc.
596 N. W. 54th St.
P. O. Box 380153
Miami 38

GEORGIA
The Hoshall Company
1314 Council Bluff Dr., N.E.
Atlanta 6

ILLINOIS
Ward Equipment Sales
8109 So. Ashland Ave.
Chicago 20

LOUISIANA
Leon C. Osborn Inc.
8232 Hickory St., P. O. Box 1472
New Orleans 18

MAINE
Larry Selleck
58 West Main Street
Yarmouth

MASSACHUSETTS
W. B. Sanford
South Street
P. O. Box 235
Medfield

MICHIGAN
G. R. Williams Sales
1619 Progress St.
Lincoln Park

NEW JERSEY
W. B. Sanford
115 N. Brookfield
Haddonfield

NEW YORK
W. B. Sanford, Inc.
601 West 26th St.
New York 1

OHIO
Associated Millwrights, Inc.
726 W. Front St.
Cincinnati 3
Anderson Engineering Co.
3537 Lee Road
Cleveland

TEXAS
Leon C. Osborn Co., Inc.
P. O. Box 1346
Harlingen

WASHINGTON
Duncan Equipment Company
506 Broadway
Seattle 22

WISCONSIN
Schroeder-McKey Co.
2740 S. 32nd Street
Milwaukee 46

Ciba Products Corporation

CALIFORNIA
Dorsett & Jackson, Inc.
840 East 60 Street
Los Angeles 1
Wm. C. Loughlin & Co.
400 Montgomery St.
San Francisco 4

COLORADO
Thompson-Hayward Chemical Co.
1501 West 13 Ave.
Denver 4

GEORGIA
Charles L. Burks & Co.
P. O. Box 54
East Point

ILLINOIS
Fred A. Jensen & Associates
510 North Dearborn Street
Chicago 10

INDIANA
Indiana Naval Stores Co.
401-409 West 17 Street
Indianapolis 2

KANSAS
Thompson-Hayward Chemical Co.
P. O. Box 2897
727 East Osie
Wichita 2

KENTUCKY
C. L. McGuire & Co.
137 St. Matthews Ave.
Louisville 7

LOUISIANA
Thompson-Hayward Chemical Co.
P. O. Box 4068, Station F
7700 Earhart Blvd.
New Orleans 18
Thompson-Hayward Chemical Co.
219 Beech St. (Agurs)
Shreveport

MARYLAND
The A. B. Kohl Sales Co.
4615 Edmondson Avenue
Baltimore 29

MASSACHUSETTS
D. H. Litter Co., Inc.
291 North Harvard Street
Allston 34

MICHIGAN
A. E. Fleming Company
1900 East Jefferson Avenue
Detroit 7

MINNESOTA
Thompson-Hayward Chemical Co.
909 Second Street, South
Minneapolis 15

MISSOURI
Harry A. Baumstark & Co.
6801 Hoffman Avenue
St. Louis 9
Thompson-Hayward Chemical Co.
2915 Southwest Blvd.
Kansas City 8

NEW YORK
Commercial Chemicals, Inc.
211 Hertel Avenue
Buffalo 7
Commercial Chemicals, Inc.
36 Winthrop Street
Rochester
D. H. Litter Co., Inc.
116 East 16th Street
New York 3

NORTH CAROLINA
Charles L. Burks & Co.
P. O. Box 1032
Black Mountain
Charles L. Burks & Co.
P. O. Box 1666
High Point

OHIO
Henry L. Grund, Inc.
Bulkley Building
Cleveland 15
T. C. Kiesel
P. O. Box 93
Pleasant Ridge Station
Cincinnati 13

OREGON
Great Western Chemical Co.
3729 N. W. Yeon
Portland

PENNSYLVANIA
John D. Butts
926 Grant Building
Pittsburgh 19
Geo. A. Rowley & Co., Inc.
937 North Front Street
Philadelphia 23

TEXAS
Thompson-Hayward Chemical Co.
P. O. Box 6226
2627 Weir Street
Dallas 22
Thompson-Hayward Chemical Co.
P. O. Box 4557
1701 Oliver Street
Houston 13
Thompson-Hayward Chemical Co.
P. O. Box 323
Lubbock
Thompson-Hayward Chemical Co.
P. O. Box 126
Grayson Street Station
222 Sequin Street
San Antonio 8

WASHINGTON
Great Western Chemical Co.
6900 Fox Ave.
Seattle 8
Great Western Chemical Co.
Pearson & Smith Division
West 1133 College Avenue
Spokane

CANADA
Bate Chemical Corp., Ltd.
44 Beechwood Drive
P. O. Box 53, Station "R"
Toronto 17, Ont.

Colloids, Inc.

CALIFORNIA
John K. Bice Co.
440 Seaton Street
Los Angeles 13
E. B. Taylor Company
422 Colyton Street
Los Angeles 13
383 Brannan Street
San Francisco 7

COLORADO
L. H. Herr Company
Interstate Trust Bldg
Denver 2

ILLINOIS
J. W. Van Tuin Co.
3118 W. Devon Ave.
Chicago 45

KANSAS
Vulcan Sales Co.
5920 Nall
Mission

MICHIGAN
F. C. Grosius
380 Hilton Road
Detroit 20

MINNESOTA
Hesco, Inc.
324-1st Street
Minneapolis 1

MISSOURI
Harry A. Baumstark & Co.
6801 Hoffman Avenue
St. Louis 9

NEW YORK
C. E. Schott Co.
555-77th Street
Brooklyn 9

NORTH CAROLINA
Colloids of Carolina, Inc.
1716 Ward Street
High Point

OHIO
Ducros & Co., Inc.
3592 Lee Road
Shaker Heights 20

OREGON
Van Waters & Rogers, Inc.
3950 N. W. Yeon Avenue
Portland 10

PENNSYLVANIA
H. J. Cranston Co.
P. O. Box 48A
Sewickley

TEXAS
Southwest Sales Co., Inc.
2400-2420 Coombs St.
P. O. Box 9275
Dallas

TEXAS (cont'd)
The E. B. McCullough Co.
2301 Commerce Street
Houston

WASHINGTON
Van Waters & Rogers, Inc.
4000 First Avenue
Seattle 4

Arthur Colton Company

CALIFORNIA
Mr. A. V. Bicknell
3757 Wilshire Blvd.
Los Angeles 5

Colton Chemical Company

LOUISIANA
Breffeilh & Co.
P. O. Box 13222
New Orleans 25

MASSACHUSETTS
Morris A. Kimmel
12 Spring Street
Lynn

MISSOURI
G. S. Robins & Co.
126 Chouteau Ave.
St. Louis 2

NEW YORK
Seaboard Chemical Corp.
198 Broadway
New York 38

OREGON
Van Waters & Rogers, Inc.
3950 N. W. Yeon St.
Portland 10

TEXAS
JaRo Chem
2323 Buffalo Drive
Houston 19
JaRo-Chem
2551 Farrington Street
Dallas 7

WASHINGTON
Van Waters & Rogers, Inc.
4000 First Avenue, South
Seattle 4

Columbian Carbon Company

CALIFORNIA
B. E. Dougherty Co.
605 3rd Street
San Francisco 7
B. E. Dougherty
1807 E. Olympic Blvd.
Los Angeles 21

COLORADO
Application Engineers, Inc.
2150 S. Bellair St.
Denver 22

GEORGIA
Charles L. Burks & Co.
P. O. Box 54
Atlanta

ILLINOIS
The Cary Co.
228 N. LaSalle St.
Chicago 1

KENTUCKY
Wm. B. Tabler Co.
P. O. Box 1254
Louisville 1

LOUISIANA
Roy T. Cucullu Company
307 Bronne Bldg.
New Orleans 12

MINNESOTA
Willard N. Swanson Co.
1015 N. 3rd St.
Minneapolis 1

MISSOURI
Abner Hood Chemical Co.
507-517 N. Montgall Ave.
Kansas City 20
J. E. Niehaus & Co.
1375 S. Kingshighway
St. Louis 3

NORTH CAROLINA
Charles L. Burks & Co.
P. O. Box 1032
Black Mountain
Charles L. Burks & Co.
P. O. Box 1666
High Ppoint

TEXAS
Roy A. Ribelin Dist. Co.
209 N. Hawkins
Dallas 26

Concord Mica Corporation

ILLINOIS
Fred A. Jensen
510 North Dearborn St.
Chicago

OHIO
S. S. Skelton Company
2775 So. Moreland Blvd.
Cleveland

MICHIGAN
George E. Moser & Son, Inc.
Penobscot Bldg.
Detroit

PENNSYLVANIA
Charles A. Wagner Co., Inc.
4455 North 6th Street
Philadelphia

CANADA
Kngsley and Keith Ltd.
3400 Namur Street,
Montreal

9 Dwight Avenue
Toronto

The Cuno Engineering Corp.

ALABAMA
George S. Edwards Company, Inc.
1920-28th Avenue, S.
Birmingham 9

COLORADO
Joy & Cox, Inc.
2124 Broadway
Denver 5

CONNECTICUT
Lewin & Sons, Inc.
310 E. Washington Avenue
Bridgeport 8
The Callahan Company
59 Hoadley Place
Hartford 1
The Page, Steele & Flagg Co.
370 State St.
North Haven
Charles A. Templeton, Inc.
Waterbury 20

FLORIDA
Control Equipment Company, Inc.
1500 Church St.
Orlando

GEORGIA
Control Equipment Company, Inc.
3166 Maple Drive, N. E.
Atlanta 5
Control Equipment Company, Inc.
3166 Maple Drive N.E.
Atlanta 5
C. L. Saunders
P. O. Box 565
Washington

INDIANA
John Carlson Co.
5744 Washington Blvd.
Indianapolis 20

IOWA
C. L. Saunders
H. G. Klug Co., Inc.
517 5th Ave.
Des Moines 9

LOUISIANA
Eggelhof Engineers, Inc.
4524 Thalia St.
P. O. Box 13186
New Orleans 26
Eggelhoff Engineers, Inc.
753 Gludson St.
Shreveport

MASSACHUSETTS
O'Connell Supply
2 Norman Street
Everett
J. Russell & Company
359 Dwight St.
Holyoke 1

MICHIGAN
J. N. Fauver Company, Inc.
49 W. Hancock Avenue
Detroit 1

MISSOURI
Hagedorn & Gannon
4030 Chouteau Avenue
St. Louis 10

Parker and Foster, Inc.
3519 Troost Ave.
Kansas City 9

NEBRASKA
H. G. Klug Company
2029 North 67th Avenue
Omaha

NEW JERSEY
Process Equipment & Supply Co.
231 State Highway 17
Rutherford

NEW YORK
King & Shepherd, Inc.
50 Church St.
New York 7

OHIO
V. L. Towner Co.
4511 Brookpark Road
Cleveland 29

OKLAHOMA
Eggelhof Engineers, Inc.
1524 Hunt Building
Tulsa 3

OREGON
John H. Marvin Co., Inc.
1233 N. W. 12th Ave.
Portland 11

PENNSYLVANIA
George P. Dempler Company
1016 Potomac Avenue
Pittsburgh 16

RHODE ISLAND
Franklin Supply Company
945 Westminster St.
Providence

TENNESSEE
G. H. Avery Company
944 Rayner St.
Memphis 14

TEXAS
Eggelhof Engineers, Inc.
4331 Belmont Avenue
Dallas 4
Eggelhof Engineers, Inc.
1912 Hussion St.
P. O. Box 1743
Houston
Eggelhof Engineers, Inc.
18th & Avenue K
Lubbock
Eggelhof Engineers, Inc.
1502 N. Main Avenue
San Antonio 1

UTAH
C. H. Spencer and Company
201 W. 33rd South
P. O. Box 1054
Salt Lake City

WASHINGTON
John H. Marvin Co.
422 First Avenue, W.
Seattle 99

CANADA
Peacock Bros., Ltd.
P. O. Box 1040
Montreal 3, Quebec

Dehydag, Deutsche Hydrierwerke GMBH

CALIFORNIA
R. E. Flatow & Co., Inc.
10 Madison Street
Oakland 4

ILLINOIS
A. H. Carnes Co.
75 East Wacker Drive
Chicago 1

LOUISIANA
B. R. Hendrix Trading Co.
409 Cotton Exchange Building
New Orleans 12

NEW YORK
Fallek Products Company, Inc.
165 Broadway
New York 6

DeLore Div. National Lead Co.,

CALIFORNIA
A. J. Lynch & Co.
4560 E. 50th St.
Los Angeles 58
2424 Blanding St.
Alameda

COLORADO
L. H. Herr Co.
712 Interestate Trust Bldg.
16th & Lawrence Sts.
Denver 2

ILLINOIS
The Cary Company
228 North La Salle St.
Chicago 1

KENTUCKY
Wm. B. Tabler Company
P. O. Box 1254
Louisville 1

LOUISIANA
Roy T. Cucullu Co.
307 Baronne Bldg.
New Orleans 12

MASSACHUSETTS
T. H. Cushman Co.
84 Winchester St.
Newton Highlands 61

MICHIGAN
Baker & Collinson Co.
12000 Mt. Elliott Ave.
Detroit 12

MINNESOTA
Lyon Chemicals, Inc.
2305 Hampden Ave.
St. Paul 14

MISSOURI
Thompson-Hayward Chem. Co.
P. O. Box 768
2915 Southwest Blvd.
Kansas City 8

NEW YORK
Columbian Carbon Co.
380 Madison Ave.
New York 17

OHIO
B. H. Roettker & Co.
3732 Lovell Ave., Cheviot
Cincinnati 11

Harshaw Chemical Co.
1945 E. 97th St.
Cleveland 6

PENNSYLVANIA
Dowdy Brothers
N. E. Cor. 33rd & Arch Sts.
Philadelphia 4

TEXAS
Thompson-Hayward Chemical Co.
P. O. Box 6226
2627 Weir St.
Dallas 22

Thompson-Hayward Chemical Co.
P. O. Box 4557
1701 Oliver St.
Houston 13

Diamond Alkali Company

CALIFORNIA
Dorsett & Jackson, Inc.
3800 Noakes Street
Los Angeles 3
Carmona Chemical Company
1000—17th Street
San Francisco 7

GEORGIA
F. H. Ross and Company
833 Memorial Drive, S. E.
Atlanta

NORTH CAROLINA
F. H. Ross, and Company
Greensboro
F. H. Ross and Company
P. O. Box 1750
Charlotte

OREGON
Van Waters & Rogers, Inc.
3920 N. W. Yeon
Portland 10

WASHINGTON
Van Waters & Rogers, Inc.
4000 First Street
Seattle, Washington

CANADA
Harrisons & Crosfield Ltd.
297 St. Paul Street West
Montreal 1, Quebec
Harrisons & Crosfield Ltd.
137 Wellington Street West
Toronto, Ontario

Diamonite Products Mfg. Company

CALIFORNIA
A. J. Lynch & Company
4560 E. 50th Street
Los Angeles 58
A. J. Lynch & Company
2424 Blanding Avenue
Alameda

COLORADO
George C. Brandt, Inc.
1940 Blake Street
Denver 2

FLORIDA
A. J. Passonno Company
107—22nd Street
Belleair Beach,
Indian Rocks

ILLINOIS
Fred A. Jensen & Associates
510 North Dearborn Street
Chicago 10

KENTUCKY
M. J. Daly Company
38 Elm Street
Ludlow

MICHIGAN
George E. Moser & Son, Inc.
17332 Shields Avenue
Detroit 12

MINNESOTA
M. H. Baker Company
109 Portland Ave., So.
Minneapolis 1

MISSOURI
Abner Hood Chemical Co.
507-517 North Montgall Ave.
Kansas City 20
Harry G. Knapp
4918 Washington Blvd.
St. Louis 8

NEW JERSEY
Paul O. Abbe Inc.
139 Center Ave.
Little Falls

NEW YORK
Jesse S. Young Co., Inc.
11 W. 42nd Street
New York 36

Columbia Carbon Internationa, Inc.
380 Madison Avenue
New York 17

OHIO
Ohio Kilns, Inc.
Granville

Economy Mfg. Company
1308 Railroad Street
P. O. Box 755
East Liverpool

National Sales Corporation
307 East Fourth Street
Cincinnati 2

Ducros & Company, Inc.
3592 Lee Road
Shaker Heights 20

PENNSYLVANIA
Chas. A. Wagner Co., Inc.
4455 North 6th Street
Philadelphia 40

The O'Hommel Company
209-213 Fourth Avenue
Pittsburgh

WASHINGTON
Great Western Chemical Co.
6921 East Marginal Way
Seattle 8

Dianol Div., Mills-Pearson Corp.

CALIFORNIA
Pacific Coast Chemicals Co.
2060 Third Street
Berkeley 10

FLORIDA
Gordon Orthner
7 Valencia Court
DeLand
A. J. White
425 Mango Lane
Jensen Beach

HAWAII
James F. Mooney
2207 Ala Wai
Honolulu

INDIANA
The August Hoffmann Co.
P. O. Box 41115
Indianapolis

NEW YORK
Smith Chemical & Color Co.
55 John Street
Brooklyn 1

OREGON
Eric C. Horlin
1815 Trade Street, S. E.
Salem

TEXAS
Lee Lawson
5426 Mercedes
Dallas 6

J. S. & W. R. Eakins, Inc.

CALIFORNIA
A. J. Lynch & Co.
4560 E. 50th Street
Los Angeles 58
Cole & De Graf
656 Townsend Street
San Francisco 3

GEORGIA
George E. Missbach & Co.
Henry Grady Bldg.
Atlanta 3

ILLINOIS
James H. Furman Company
59 East Van Buren Street
Chicago 5

KENTUCKY
C. L. McGuire & Co.
900 Dumesnil St.
Louisville 3

LOUISIANA
Griffith-Mehaffey Co., Inc.
102 Poydras St.
New Orleans 12

MARYLAND
A. B. Kohl
4615 Edmondson Avenue
Baltimore 29

MASSACHUSETTS
R. T. Freeman Co.
Hingham Industrial Center
Boston

MICHIGAN
Northwest Sales, Inc.
16943 James Couzens Hwy.
Detroit 35

NEW YORK
James O. Meyers & Sons
290 Larkin Street
Buffalo 10

OHIO
Rice & Company
325 Bulkley Building
Cleveland 15

OREGON
Martin, Hoyt & Milne
1501 N. W. Kearney
Portland

PENNSYLVANIA
The O. Hommel Company
P. O. Box 475
Pittsburgh

WASHINGTON
Martin, Hoyt & Milne
10-16 First Ave., S.
Seattle

CANADA
Prescott & Company
2209 Hingston Avenue
Montreal, Quebec

Eastman Chemical Products, Inc.

CALIFORNIA
Wilson Meyer Co.
2060 South Garfield Avenue
Los Angeles 22

Wilson Meyer Co.
333 Montgomery St.
San Francisco 4

OREGON
Wilson Meyer Co.
520 S. W. 6th St.
Portland 4

WASHINGTON
Wilson Meyer Co.
318 Queen Anne Avenue
Seattle 9

Epworth Mfg. Co.

ILLINOIS
Carl A. Lechner Company
1515 West Howard Street
Chicago 26

KENTUCKY
Wm. Tabler Company
Post Office Box 1254
Louisville 1

MINNESOTA
Horton Earle Company
6127 Excelsior Boulevard
Minneapolis 16

MISSOURI
H. C. Ackerman
Ack Sales Company
901 East 13th Avenue
North Kansas City 16

Ferro Chemical Corporation

CALIFORNIA
Dorsett & Jackson, Inc.
3800 Noakes Avenue
Los Angeles 23
Ramco
95 Market Street
Oakland 7

COLORADO
George C. Brandt, Inc.
1920 Market Street
Denver 2

GEORGIA
George E. Missbach Co.
707 Henry Grady Bldg.
Atlanta 3

ILLINOIS
Daniel G. Hereley Co.
1607 Howard Street
Chicago 26

KANSAS
George C. Brandt, Inc.
3150 Fiberglass Road
Kansas City 15

KENTUCKY
Lewis & Company
106 W. Main Street
Louisville 2

LOUISIANA
Griffith-Mehaffey Co., Inc.
640 S. Front St.
New Orleans 12

MARYLAND
G. T. Weiss Co.
P. O. Box 6980
Baltimore 16

MASSACHUSETTS
A. C. Nispel, Inc.
150 Causeway Street
Boston 14

MICHIGAN
D. H. Osgood Co.
4181 Oakman Blvd.
Detroit 4

MINNESOTA
George C. Brandt, Inc.
739 Pillsbury Avenue
St. Paul 14

MISSOURI
Ivan T. Bauman Co.
817 N. Second St.
St. Louis 2

NEW YORK
James O. Meyers Sons
290 Larkin Street
Buffalo 10

OHIO
Palmer Supplies Co.
1200 Times-Star Bldg.
Cincinnati 2
Fred W. Kamin
14820 Detroit Avenue
Cleveland 7

PENNSYLVANIA
O. L. West Co.
50 E. Wynnewood Rd.
Room 202
Wynnewood
Campbell Chemical Co.
P. O. Box 486
Carnegie, Pa.

TEXAS
W. W. Richerson
2nd Unit-Sante Fe Bldg.
Dallas 2
Joe Coulson Company
Box 14442
6015 Murphy St.
Houston 1

WISCONSIN
J. W. Copps, Inc.
333 W. Silver Springs Dr.
Milwaukee 17

Food Machinery and Chemical Corporation

CALIFORNIA
Chemical and Plastics Division.
2121 Yates Avenue
Los Angeles 22
Evanstrom Co.
22 Battery Street
San Francisco 11

ILLINOIS
Central Solvents and Chemicals Co.,
2540 West Flournoy St.
Chicago 12

INDIANA
Hoosier Solvents and Chemicals Corp.
Nelson Road East
Fort Wayne
Hoosier Solvents and Chemicals Corp.
1650 North Luett Avenue
Indianapolis 22

KENTUCKY
Dixie Solvents & Chemicals Co.
Dixie Hgwy. at Appleton Lane
Louisville 16

LOUISIANA
Southern Solvents & Chemicals Co.
917 Jefferson Highway (Southport)
New Orleans 18

MASSACHUSETTS
Philipp Brothers Chemicals Inc.
10 High Street
Boston 10

MICHIGAN
Western Solvents & Chemicals Co.
6472 Selkirk Avenue
Detroit 11
Wolverine Solvents & Chemicals Co.
2940 Stafford Avenue
Grand Rapids 8

MISSOURI
Missouri Solvents & Chemicals Corp.
2522 Nicholson Ave.
Kansas City 20
Missouri Solvents & Chemicals Corp.
419 De Soto Avenue
St. Louis 7

NEW JERSEY
Stoney-Mueller, Inc.
Page and Newark Avenues
Lyndhurst
Joseph Turner and Co.
Ridgefield

OHIO
Amsco Solvents & Chemicals Co.
4619 Reading Road
Cincinnati 29
Ohio Solvents & Chemicals Co.
3470 West 140th Street
Cleveland 11
Toledo Solvents & Chemical Co.
4051 South Avenue
Toledo 14

RHODE ISLAND
Philipp Brothers Chemicals, Inc.
511 Westminster Street
Providence

TEXAS
Texas Solvents & Chemicals Co.
2500 Vinson St.
Dallas 12
Texas Solvents & Chemicals Co.
8501 Market Street
Houston 15

WISCONSIN
Wisconsin Solvents & Chemicals Co.
1719 South 83rd St.
Milwaukee 14

CANADA
Canada Colors & Chemicals Ltd.
5165 Sherbrooke St., W.
Montreal, Quebec
Canada Colors & Chemicals Ltd.
1090 King Street West
Toronto 1, Ontario

Foremost Food and Chemical Company

GEORGIA
Geo. E. Missbach & Co.
Henry Grady Building
Atlanta 3

ILLINOIS
M. B. Sweet Company
195 Olympia Plaza
Chicago Heights

LOUISIANA
Breffeilh & Sheahan Company
P. O. Box 13222
New Orleans 25

MASSACHUSETTS
N. S. Wilson & Sons
150 Causeway Street
Boston 14

MICHIGAN
Harry Holland & Son, Inc.
10600 Puritan Avenue
Detroit 38

MINNESOTA
M. H. Baker Company
109 Portland Avenue South
Minneapolis 1

MISSOURI
Vulcan Sales Company
5920 Nall
Mission
Harry A. Baumstark & Company
6801 Hoffman Avenue
St. Louis 9

NEW YORK
H. Reisman Company
114 Liberty Street
New York 6

OHIO
F. W. Kamin Company
14820 Detroit Avenue
Lakewood 7

OKLAHOMA
Rullman Brothers
P. O. Box 7031
Oklahoma City 12

TEXAS
Joe Coulson Company
6015 Murphy Avenue
Houston 21

Franklin Mineral Products Co.

CALIFORNIA
The B. F. Dougherty Co.
1807 East Olympic Boulevard
Los Angeles 21
The B. F. Dougherty Co.
725 Second Street
San Francisco 7

FLORIDA
Palmer Supplies Company
211 East Robinson Avenue
Orlando

ILLINOIS
The Cary Company
228 North LaSalle Street
Chicago 1

LOUISIANA
Roy T. Cucullu Company
307 Baronne Building
New Orleans 12

MASSACHUSETTS
The Huse-Liberty Mica Company
Peabody Industrial Center
Peabody

MICHIGAN
Baker & Collinson
12000 Mt. Elliott
Detroit 12

NEW YORK
Smith Chemical & Color Co.
55 John Street
Brooklyn 1
Whittaker, Clark & Daniels, Inc.
100 Church Street
New York 7
Columbia Carbon International
Binney & Smith International
380 Madison Avenue
New York 17

NORTH CAROLINA
Allison B. Wood & Company
P. O. Box 11255
Charlotte 9

OHIO
Farley Chemical & Solvents Co.
309 Silver Street
Akron
F. F. Myers Company
Akron Savings & Loan Building
Akron 8
Palmer Supplies Company
2281 Scranton Road
Cleveland 13
Palmer Supplies Company
Times Star Building
Cincinnati 2

PENNSYLVANIA
George A. Rowley & Company
937 North Front Street
Philadelphia 23

Freeman Chemical Corporation

LOUISIANA
Roy T. Cicalla Co.
307 Baronne Bldg.
New Orleans 12

MICHIGAN
Matteson-Van Wey, Inc.
16901 W. 8th Mile Rd.
Detroit 35

MINNESOTA
Hesco, Inc.
6127 Excelsior Blvd.
Minneapolis

OHIO
Charles M. Rice & Co.
325 Bulkley Bldg.
Cleveland 15

PENNSYLVANIA
A. C. Hurlbrink
3701 North Broad St.
Philadelphia

TENNESSEE
John Sheahan & Co.
625 S. Front St.
Memphis 2

Georgia Kaolin Company

CALIFORNIA
Wharton Jackson Company
475 Huntington Drive
San Marino 9

COLORADO
Thompson-Hayward Chemical Company
1501 West 13th Avenue
Denver 4

ILLINOIS
The Cary Company
228 North LaSalle St.
Chicago 1

IOWA
Thompson-Hayward Chemical Company
Box 176
Davenport
Thompson-Hayward Chemical Company
First St. S. W.
Des Moines 15

MASSACHUSETTS
Chemicals & Pigments Corporation
227 California Street
Newton 58

MICHIGAN
Baker & Collinson, Inc.
12000 Mt. Elliott
Detroit 12

MINNESOTA
Thompson-Hayward Chemical Company
909 Second Street South
Minneapolis 15

MISSOURI
G. S. Robins & Company
126 Chouteau Avenue
St. Louis 2
Thompson-Hayward Chemical Company
2915 Southwest Blvd.
Kansas City 8

MISSOURI (cont'd)
Thompson-Hayward Chemical Company
5 Carr Street
St. Louis 2

NEW YORK
Commercial Chemicals, Inc.
211 Hertel Avenue
Buffalo 7
The Dyal Company
99 Hudson Street
New York 13
Hammill & Gillespie, Inc.
225 Broadway
New York 7
Whittaker, Clark & Daniels, Inc.
100 Church Street
New York 7

OHIO
Palmer Supplies Company
2281 Scranton Road
Cleveland 13

OREGON
W. Ronald Benson, Inc.
2505 S. E. 11th Avenue
Portland 2

PENNSYLVANIA
Geo. A. Rowley & Company, Inc.
937 North Front Street
Philadelphia 23

TEXAS
Thompson-Hayward Chemical Company
Box 6226
Dallas 22
Thompson-Hayward Chemical Company
Box 4557
Houston

WASHINGTON
W. Ronald Benson, Inc.
820 First Avenue South
Seattle 4

Georgia Marble Company

CALIFORNIA
John K. Bice Company
440 Seaton Street
Los Angeles 13
Pacific Coast Chemicals Co.
2060 Third Street
Berkeley 10

COLORADO
George C. Brandt, Inc.
1940 Blake Street
Denver 2

GEORGIA
R. T. Hopkins Company
544 Means Street, N. W.
Atlanta 18

ILLINOIS
Daniel G. Hereley Company
1607 Howard Street
Chicago 26

KENTUCKY
The L. A. Miller Company
314 Republic Building
Louisville

LOUISIANA
Griffith-Mehaffey Co., Inc.
640 S. Front Street
New Orleans 12

MASSACHUSETTS
Wyrough and Loser
751 Main Street
Waltham 54

MINNESOTA
George C. Brandt, Inc.
739 Pillsbury Avenue
St. Paul 14

MISSOURI
G. S. Robins & Company
126 Chouteau Avenue
St. Louis 2

Morton-Myers Company
220 E. Missouri Avenue
Kansas City 6

NEW JERSEY
Wyrough and Loser
838 Broad St. Bank Bldg.
Trenton 8

NEW YORK
Smith Chemical & Color Co.
55 John Street
Brooklyn 1

NORTH CAROLINA
Allison B. Wood Company
Box 11255
Charlotte

OHIO
Norman G. Schabel Company
20950 Center Ridge Road
Cleveland 16

Deeks and Company
6433 Wiehe Road
Cincinnati 2

OREGON
W. Ronald Benson, Inc.
2505 S. E. 11th Avenue
Portland 2

PENNSYLVANIA
Joseph A. Burns & Son
124 Harrison Avenue
Pittsburgh

TENNESSEE
Chapman Chemical Company
60 North Third Street
Memphis

TEXAS
Joe Coulson Company
P. O. Box 14442
6015 Murphy Avenue
Houston 21
Southwest Sales Company
P. O. Box 9275
2400-2420 Coombs Street
Dallas 15

WASHINGTON
W. Ronald Benson, Inc.
820 First Avenue, South
Seattle 4

WISCONSIN
Harold T. Illing Company
4200 West Monarch Place
Milwaukee 8

CANADA
Van Waters & Rogers of Canada Ltd.
Commercial Chemicals Division
2625 Skeena Street
Vancouver 12
Frank E. Dempsey & Company Ltd.
266 Parliament Street
Toronto 2
Frank E. Dempsey & Company Ltd.
407 McGill Street
Montreal 22

A. Gross & Company

CALIFORNIA
Braun-Knecht-Heimann Co., Div. of Van Waters & Rogers, Inc.
1400 16th St.
San Francisco 19
Braun Chemical Co., Div. of Van Waters & Rogers, Inc.
1363 So. Bonnie Beach Place
Los Angeles 54

ILLINOIS
Carl Lechner, Inc.
1791 W. Howard St.
Chicago 26, Ill.

IOWA
Thompson-Hayward Chemical Co.
S. W. First & Granger
Des Moines 15

KANSAS
Thompson-Hayward Chemical Co.
727 E. Osie St.
Wichita 2

LOUISIANA
Thompson-Hayward Chemical Co.
7700 Earhart Blvd.
New Orleans 18

MASSACHUSETTS
George Mann & Co., Inc.
105 Central St.
Stoneham 80

MICHIGAN
R. M. Stevenson Co.
18228 Mack Ave.
Detroit 36

MISSOURI
Thompson-Hayward Chemical Co.
5915 Southwest Blvd.
Kansas City 8
Thompson-Hayward Chemical Co.
2 Carr St.
St. Louis 2

NEBRASKA
Thompson-Hayward Chemical Co.
1110 S. 4th St.
Omaha 8

NEW YORK
James O. Meyers' Sons
Wilson Warehouse, Inc.
290 Larkin Street
Buffalo 10

NORTH CAROLINA
General Bonded Warehouses Inc.
4001 Raleigh St.
Charlotte

OKLAHOMA
Thompson-Hayward Chemical Co.
36 N. Guthrie St.
Tulsa 3
Thompson-Hayward Chemical Co.
3909 So. Meridian Ave.
Okla. City 19

OHIO
Harold C. Hall
Mariemont Hotel Bldg.
Cincinnati 27
Ducros & Company
3617 Lee Road
Shaker Heights 20

OREGON
Van Waters & Rogers, Inc.
3950 N.W. Yeon Ave.
Portland 10

PENNSYLVANIA
Baker Industrial Oils Co.
18 W. Chelten Ave.
Philadelphia 44
J. C. Ackerman Company
Penn-Lincoln Hotel
Pittsburgh 21

RHODE ISLAND
George Mann & Co., Inc.
251 Fox Point Blvd.
Providence 3

TENNESSEE
Thompson-Hayward Chemical Co.
1585 Harbor Avenue
Memphis 1

TEXAS
Thompson-Hayward Chemical Co.
2627 Weir Street
Dallas 1
Thompson-Hayward Chemical Co.
1701 Oliver Street
Houston 13

UTAH
Braun-Knecht-Heimann Co., Div. of Van Waters & Rogers, Inc.
650 W. 8th South
Salt Lake City

WASHINGTON
Van Waters & Rogers, Inc.
4000 First Ave. So.
Seattle 4

CANADA
Charles Albert Smith Limited
8307 Royden Road
Montreal 9, Quebec
Charles Albert Smith Limited
356 Eastern Avenue
Toronto 8

Haeuser Shellac Company

CALIFORNIA
R. E. Flatow & Co., Inc.
10 Madison St.
Oakland 4

ILLINOIS
Jas. H. Furman Co.
59 E. Van Buren St.
Chicago

KENTUCKY
Lewis & Co. of Kentucky
102 West Main St.
Louisville

MASSACHUSETTS
Herbert B. Lewis Co.
30 Huntington Ave.
Boston 16

MICHIGAN
Baker & Collinson
12000 Mt. Elliot Ave.
Detroit

OHIO
T. C. Kiesel
P. O. Box 93
Pleasant Ridge Station
Cincinnati 13

PHILADELPHIA
E. W. Kaufmann
P. O. Box 27
Flourtown

Hayden Mica Company, Inc.

CALIFORNIA
Pacific Coast Chemicals Co.
2060 Third Street
Berkeley 10

John K. Bice Co.
440 Seaton Street
Los Angeles 13

ILLINOIS
Harry Holland & Sons, Inc.
9 South Clinton Street
Chicago 6

MASSACHUSETTS
Ernest Jacoby & Co., Inc.
585 Boylston Street
Boston 16

NEW YORK
Superior Materials, Inc.
120 Liberty Street
New York 6

OHIO
Donald McKay Smith, Inc.
550 Hanna Building
Cleveland 15

OREGON
W. Ronald Benson, Inc.
2505 S. E. 11th Street
Portland

PENNSYLVANIA
Dowdy Bros.
33rd & Arch Street
Philadelphia 4

WASHINGTON
W. Ronald Benson, Inc.
820 First Avenue South
Seattle 4

CANADA
Prescott & Company, Reg'd.
2209 Hingston Avenue
Montreal 28, Quebec

Haynie Products, Inc.

CALIFORNIA
A. J. Lynch & Co.
4560 E. 50th Street
Los Angeles

Cole & DeGraf
656 Townsend Street
San Francisco

COLORADO
L. H. Herr Co.
712 Interstate Building
Denver

FLORIDA
Charles L. Burks & Co.
Tampa

GEORGIA
Charles L. Burks & Co.
P. O. Box 54
East Point

ILLINOIS
Edward J. Lewis & Co.
9 South Clinton Street
Chicago

KENTUCKY
H. H. Benner Co.
803 Hoffman Building
Louisville

LOUISIANA
Lastrapes Bros.
322 Broad of Trade Arcade
New Orleans

MASSACHUSETTS
C. K. Mullin, Inc.
160 North Washington St.
Boston

MICHIGAN
Norman G. Schabel Co.
Detroit

MINNESOTA
M. H. Baker Co.
109 Portland Avenue
Minneapolis

MISSOURI
Morton-Myers Co.
220 E. Missouri Avenue
Kansas City
Harry G. Knapp
4918 Washington Blvd.
St. Louis

NEW YORK
Jesse S. Young Co., Inc.
11 West 42nd Street
New York City

NORTH CAROLINA
Charles L. Burks & Co.
P. O. Box 1032
Black Mountain
Charles L. Burks & Co.
P. O. Box 1666
High Point

OHIO
M. J. Daly Co.
38 Elm Street
Cincinnati
Norman G. Schabel Co.
20950 Center Ridge Road
Cleveland

OREGON
McCloskey Varnish Co. of the Northwest
4155 N. W. Yeon Avenue
Portland

PENNSYLVANIA
John D. Butts
Grant Building
Pittsburgh

TEXAS
W. W. Richerson Co.
712 Unit 2 Santa Fe Bldg.
Dallas
Joe Coulson Co.
6015 Murphy Avenue
Houston

WISCONSIN
Edward J. Lewis & Co.
Milwaukee

Hercules Filter Corp.

CALIFORNIA
E. J. Brinkmeyer
136 No. Orlando Avenue
Los Angeles

MISSOURI
Carel van Luin
New Halls Ferry Rd.
Route No. 3
Box No. 53
Florissant

Herman Hockmeyer & Co.

CALIFORNIA
Roberts McMillin Co.
95 Market St.
Oakland 7
Samson Raw Materials Co.
435 South La Cienega Blvd.
Los Angeles 48

FLORIDA
A. J. Passonno Co.
107 22nd St.
Belleair Beach

MARYLAND
A. B. Kohl Sales Co.
4615 Edmondson Ave.
Baltimore

MASSACHUSETTS
Herb B. Lewis Co.
30 Huntington Ave.
Boston

OHIO
N. G. Schabel Co.
20950 Center Ridge Road
Cleveland

PENNSYLVANIA
E. W. Kaufmann Co.
P. O. Box 27
Flourtown

WASHINGTON
W. R. Benson
820 F. Avenue, South
Seattle

Holland Color & Chemical Company

CALIFORNIA
W. M. Gillies, Inc.
6505 Wilshire Blvd.
Los Angeles 48
Ramco
95 Market St.
Oakland

COLORADO
George C. Brandt, Inc.
1940 Blake St.
Denver 2

FLORIDA
C. Withington Co.
1641 Landon Ave.
Jacksonville

GEORGIA
Nottingham Co.
1257 Chattachoochee Ave.
Atlanta

ILLINOIS
D. G. Hereley Co.
1607 Howard St.
Chicago

KANSAS
George C. Brandt, Inc.
3150 Fiberglas Rd.
Kansas City

MARYLAND
Wm. McGill
237 President St.
Baltimore 2

MASSACHUSETTS
Herbert B. Lewis Co.
30 Huntington Ave.
Boston

MICHIGAN
Matteson-Van Wey, Inc.
16901 W. 8 Mile Rd.
Detroit 35

MINNESOTA
George C. Brandt, Inc.
739 Pillsbury Ave.
St. Paul 14

MISSOURI
H. A. Baumstark Co.
6801 Hoffman Ave.
St. Louis 9

NEW JERSEY
American Mineral Spirits Co
Mountain Ave.
Murray Hill

NEW YORK
James O. Meyers' Sons
290 Larkin St.
Buffalo 10

OHIO
T. C. Kiesel
P. O. Box 93
Cincinnati 13

A. C. Mueller Co.
14625 Detroit Ave.
Cleveland 7

PENNSYLVANIA
O. L. West Co.
50 E. Waynewood Rd.
Wynnewood

TENNESSEE
J. P. Sheahan Co.
P. O. Box 2844
625 S. Front St.
Memphis

TEXAS
W. W. Richardson Co.
712 Unit 2, Santa Fe Bldg.
Dallas 2

E. B. McCullough Co.
P. O. Box 9794
Houston 15

WASHINGTON
D. B. Smith Co.
1016 1st Ave. S
Seattle

WISCONSIN
J. W. Copps
333 W. Silver Spring Drive
Milwaukee 17

CANADA
Drew Brown, Ltd.
Montreal, Quebec

Drew Brown, Ltd.
Toronto, Ontario

Drew Brown, Ltd.
Vancouver, B. C.

J. M. Huber Corp.

CALIFORNIA
John K. Bice Co.
400 Seaton St.
Los Angeles 13
Pacific Coast Chemicals Co.
2060 Third St.
Berkeley 10

FLORIDA
C. Withington Co., Inc.
1641 Landon Ave.
Jacksonville

ILLINOIS
Daniel G. Hereley Co.
1607 Howard
Chicago 26

NEW YORK
C. Withington Co., Inc.
47-40—5th Street
Long Island City

International Talc Co.

CALIFORNIA
A. J. Lynch & Co.
4560 E. 50th St.
Los Angeles 58

COLORADO
George C. Brandt, Inc.
1940 Blake Street
Denver

FLORIDA
Mr. A. J. Passonno
107-22nd Street
Belleair Beach
Indian Rocks

GEORGIA
A. J. Passonno
B. B. Indian Rocks,
Calif.

ILLINOIS
The Cary Co.
228 N. LaSalle Street
Chicago 1

KENTUCKY
The L. A. Miller Co.
314 Republic Bldg.
Louisville

MARYLAND
A. L. Webb & Sons, Inc.
1411 Fleet Street
Baltimore 31

MASSACHUSETTS
Lukens Chemical Co.
227 California St.
Newton 58

MINNESOTA
George C. Brandt, Inc.
739 Pillsbury Avenue
St. Paul 14

MISSOURI
Abner Hood Chemical Co.
Montgall & Guinotte Ave.
Station "F"
Kansas City
J. E. Niehaus & Co.
3419 Gratiot Street
St. Louis 3

NEW YORK
Columbian Carbon International, Inc.
380 Madison Ave.
New York 17

NORTH CAROLINA
Wm. McGill & Co.
237 President Street
Baltimore 2

SOUTH CAROLINA
Wm. McGillico
237 President St.
Baltimore 2

OHIO
The A. G. Watt Co.
P. O. Box 874
Shaker Heights
The Paul Wiemer Co.
Norwood 12

OKLAHOMA
Rullman Bros.
P. O. Box 7031
2204 N. W. 31
Oklahoma City

PENNSYLVANIA
Charles A. Wagner Co., Inc.
4455 N. 6th St.
Philadelphia 40
E. E. Zimmerman Co.
1704 Keenan Bldg.
Pittsburgh

TEXAS
Joe Coulson Co.
6015 Murphy Ave.
P. O. Box 14442
Houston 2
JaRo-Chem
2551 Farrington
Dallas

WISCONSIN
Harold T. Illing Co.
4200 W. Monarch Place
Milwaukee 8

CANADA
St. Lawrence Chemical Co. Ltd.
5405 Pare St.
Montreal 16, Que.

St. Lawrence Chemical Co. Ltd.
47 Gurney Crescent
Toronto 19, Ont.

Spencer Kellogg & Sons, Inc.

CALIFORNIA
Dorsett & Jackson, Inc.
3800 Noakes Street
Los Angeles 23

Carmona Chemical Co.
1001-17th Street
San Francisco 7

COLORADO
L. H. Herr Company
712 Interstate Trust Bldg.
Denver 2

GEORGIA
Charles L. Burks & Company
P. O. Box 54
East Point

LOUISIANA
Lastrapes Bros.
322 Board of Trade Arcade
New Orleans 12

MISSOURI
Abner Hood Chemical Co.
507 N. Montgall Street
Kansas City 1

NEBRASKA
French Brokerage Company
1402 Nicholas Street
Omaha 2

NORTH CAROLINA
Charles L. Burks & Company
P. O. Box 1032
Black Mountain

NORTH CAROLINA (cont'd)
Charles L. Burks & Company
P. O. Box 1666
High Point

OREGON
Great Western Chemical Co.
3720 N. W. Yeon Avenue
Portland 10

PENNSYLVANIA
John D. Butts Company
926 Grant Building
Pittsburgh 19

RHODE ISLAND
Sessions-Gifford Co., Inc.
255 Allen Ave.
Providence 1

TENNESSEE
Chapman Chemical Company
P. O. Box 138
Memphis

TEXAS
JaRo-Chem
P. O. Box 10544
Dallas 7
Ed Kedy Co
Robinson Public Warehouse
2323 Buffalo Drive
Houston 19

WASHINGTON
Great Western Chemical Co.
6921 East Marginal Way
Seattle 8

Kinetic Dispersion Corporation

CALIFORNIA
A. J. Lynch & Co.
4560 E. 50th St.
Los Angeles 58
A. J. Lynch & Co.
2424 Blanding St.
Alameda

COLORADO
Thompson-Hayward Chemical Co.
1501 W. 13th Ave.
Denver 4

FLORIDA
Palmer Supplies Co. of Florida
209-211 E. Robinson Ave.
Orlando

ILLINOIS
Philip E. Calo Co.
333 N. Michigan Ave.
Chicago 1

KENTUCKY
C. L. McGuire and Co.
137 St. Matthews Ave.
Louisville 7

LOUISIANA
Thompson-Hayward Chemical Co.
311 Lowerline
New Orleans 18

MARYLAND
Wm. McGill Co.
237 President St.
Baltimore

MINNESOTA
Thompson-Hayward Chemical Co.
909 Second St.
Minneapolis 16

MISSOURI
Thompson-Hayward Chemical Co.
5 Carr St.
St. Louis 2

Thompson-Hayward Chemical Co.
2915 Southwest Blvd.
Kansas City 8

OHIO
Rice and Co.
325 Bulkley Bldg.
Cleveland 15

PENNSYLVANIA
The W. J. Grant Co.
38 Maplewood Ave.
Philadelphia 44

TEXAS
Thompson-Hayward Chemical Co.
P. O. Box 6226
Dallas 1

Thompson-Hayward Chemical Co.
2600 Crockett
Houston 13

Thompson-Hayward Chemical Co.
P. O. Box 323
Lubbock

Thompson-Hayward Chemical Co.
222 Sequin
San Antonio

CANADA
Chas. Tennant & Co., Ltd.
1303 Yonge St.
Toronto 7

McWhorter Chemicals, Inc.

ILLINOIS
Carl A. Lechner Company
1515 W. Howard Street
Chicago 26

MISSOURI
Ack Sales Company
901 E. 13th Street
No. Kansas City

OHIO
Dimlich-Radcliffe Company
13125 Shaker Square
Cleveland

WISCONSIN
J. W. Copps Company
331 W. Silversprings Drive
Milwaukee

Macbeth Daylighting Corp.

CALIFORNIA
E. S. Browning Company
2321 Yates Avenue
Los Angeles 22
E. S. Browning Company
1515 Third Street
San Francisco 7

CONNECTICUT
Arthur T. Hatton & Co.
1000 Farmington Avenue
West Hartford 7

MASSACHUSETTS
Arthur T. Hatton & Company
246 Walnut Street
Newtonville

MICHIGAN
D. H. Osgood Company
4181 Oakman Boulevard
Detroit 4

MISSOURI
Wells-White Company
3937 Main Street
Kansas City 11

MISSOURI (cont'd)
Wells-White Company
301 Connor Building
6625 Delmar Boulevard
St. Louis 30

NORTH CAROLINA
Slaughter Machinery Company
P. O. Box 11176
208 West Griffith Street
Charlotte 9

OHIO
Merrifield Company
730 Brooks Avenue
Cincinnati 15

TENNESSEE
Fluorescent Service Company
171 North Evergreen
Memphis

TEXAS
Daltex Cotton Company
P. O. Box 1410
817 Cotton Exchange Bldg.
Dallas 21

WASHINGTON
Universal Plastics Company
1105 Westlake Avenue North
Seattle 9

Manton Gaulin Manufacturing Co., Inc.

ALABAMA
D. B. Gooch Associates, Inc.
5018 First Avenue, North
Birmingham 6

CALIFORNIA
E. M. Underwood & Co.
2101 Rowena Ave.
Los Angeles 39
E. M. Underwood & Co.
4385 Piedmont Ave.
Oakland 11

COLORADO
Alldredge & McCabe
847 East 17th Avenue
Denver 18

CONNECTICUT
Joseph H. Bertram & Co.
998 Farmington Ave.
West Hartford 7

FLORIDA
Johnson Roney II & Associates
P. O. Box 26
Clearwater

ILLINOIS
Fuente and Webster, Inc.
549 West Randolph Street
Chicago 6

INDIANA
Avels Sales & Engineering Co.
1407 E. Riverside Drive
Indianapolis

MASSACHUSETTS
Joseph H. Bertram & Co.
570 Hillside Ave.
Needham Heights 94

MICHIGAN
H. A. Reed Company
19465 James Couzens Highway
Detroit 36

MINNESOTA
George R. Mellema Company
620 Plymouth Building
Minneapolis 3

MISSOURI
Wharton L. Peters Machinery Company
3863 West Pine Boulevard
St. Louis 8

NEW JERSEY
Frederick E. Herstein & Associates
Benninger Building
1429 Route 22
Mountainside

NEW YORK
A. W. Johnston Co.
2021 Clinton St.
Buffalo 6

Kenneth S. Valentine, Inc.
112 West 83rd Street
New York 24

OHIO
White Industrial Sales & Equipment Company
919 Second National Building
Akron 8

White Industrial Sales & Equipment Company
140 West Sixth Street
Cincinnati 2

White Industrial Sales & Equipment Company
227 Hanna Building
Cleveland 15

OKLAHOMA
Edward Soph Company
202 East 18th Street
Tulsa

PENNSYLVANIA
R. W. Fox Company
P. O. Box 196
Newton Square

White Industrial Sales & Equipment Company
612 Farmers Bank Building
Pittsburgh 22

TEXAS
Edward Soph Company
768A M & M Building
Houston 2

WASHINGTON
Burhans-Sharpe Co.
1731 1st Ave. S.
Seattle 4

WEST VIRGINIA
White Industrial Sales & Equipment Company
1033 Quarrier Building
Charleston 1

CANADA
Richardson Agencies, Ltd.
640 Laurentian Blvd., Suite 4
Montreal 9, Quebec

Richardson Agencies, Ltd.
Rear 18 Holly Street
Toronto, Ontario

Harvey Carruthers
9 East Broadway
Vancouver 10, B. C.

Marbon Chemical Company
Div. of Borg-Warner

CALIFORNIA
Harwick Standard Chemical Co.
1248 Wholesale Street
Los Angeles

ILLINOIS
Carl Lechner, Inc.
1515 West Howard Street
Chicago

MASSACHUSETTS
D. H. Litter Company, Inc.
291 North Harvard Street
Allston 34

MICHIGAN
Baker & Collinson
12000 Mt. Elliott
Detroit 12

MISSOURI
Ack Sales Company
901 East Thirteenth Avenue
North Kansas City
Harry A. Baumstark & Co.
6801 Hoffman Avenue
St. Louis 9

NEW YORK
D. H. Litter Company, Inc.
116 East 16th Street
New York

OHIO
A. C. Mueller, Incorporated
14625 Detroit Avenue
Cleveland

PENNSYLVANIA
Harry W. Gaffney
1510 Girard Trust Building
1400 South Penn Square
Philadelphia 2

Matherson-Selig Co.

CALIFORNIA
Sheldon T. Dahl
816 West Fifth St.
Los Angeles 17
Sheldon T. Dahl
210 California Street
San Francisco 11

NEW YORK
Dudley Garland
420 Lexington Ave.
New York

Mearl Corporation

CALIFORNIA
S. L. Abbot Co.
4255 District Blvd.
Los Angeles 58
S. L. Abbot Co.
135 King Street
San Francisco

ILLINOIS
Midwest Technical Sales & Services
Box 61
Downers Grove

OHIO
James Sales Co.
6188 Pearl Rd.
Cleveland 30

Metalsalts Corporation

CALIFORNIA
The C. P. Hall Co.
1340 E. Sixth St.
Los Angeles 21
L. H. Butcher Co.
15th & Vermont Sts.
San Francisco
L. H. Butcher Co.
3628 E. Olympic Blvd.
Los Angeles
Braun-Knecht-Heimann
1400 16th St.
San Francisco

ILLINOIS
The C. P. Hall Co. of Ill.
5245 West 73rd St.
Chicago 38
Harry Holland & Son, Inc.
9 S. Clinton St.
Chicago 6

MICHIGAN
Harry Holland & Son, Inc.
10600 Puritan
Detroit 38

NEW JERSEY
The C. P. Hall Company
Wheeler Point Rd.
Newark 5

NEW YORK
Whittaker, Clark & Daniels, Inc.
100 Church St.
New York 7

OHIO
The C. P. Hall Company
414 South Broadway
Akron 8
Palmer Supplies Co.
Times Star Bldg.
800 Broadway
Cincinnati 2

OREGON
Van Waters & Rogers Inc.
3950 N. W. Yeon St.
Portland 10
L. H. Butcher Company
2750 N. W. 31st Ave.
Portland 10

PENNSYLVANIA
R. Peltz Co.
218 Wilford Bldg.
33rd & Arch St.
Philadelphia

TENNESSEE
The C. P. Hall Co. of Ill.
648 Riverside Drive
Memphis

UTAH
L. H. Butcher Company
407 W. 17th South St.
Salt Lake City

WASHINGTON
Van Waters & Robers Inc.
4000 First Avenue So.
Seattle
L. H. Butcher Co.
1703 6th Ave.
Seattle 4

Merck Marine Magnesium Division

CALIFORNIA
A. J. Lynch & Company
2424 Blanding Avenue
Alameda
A. J. Lynch & Company
4560 East 50th Street
Los Angeles 58

FLORIDA
Fred H. Palmer, Jr.
211 E. Robinson Ave.
Orlando
Warren K. Palmer
4471 N. W. 36th St.
Miami Springs

ILLINOIS
Philip E. Calo Company
333 North Michigan Ave.
Chicago 1

KENTUCKY
L. A. Miller Co.
314 Republic Bldg.
Louisville 2

MASSACHUSETTS
Wyrough & Loser
751 Main Street
Waltham 54

MINNESOTA
Philip E. Calo Company
6518 Walker St.
Minneapolis 26

NEW JERSEY
Wyrough & Loser
838 Broad St., Bank Bldg.
Trenton 8

NEW YORK
Superior Materials, Inc.
120 Liberty St.
New York 6

NORTH CAROLINA
Allisan B. Wood Co.
P. O. Box 11255
Charlotte 9

OHIO
Fred H. Palmer, III
2281 Scranton Rd.
Cleveland

OREGON
Cordano Chemical Co.
56 S. E. Belmont
Portland 14

PENNSYLVANIA
Harwood J. Cranston
R. D. 2, Box 48A
Sewickley

TEXAS
Roy A. Ribelin Distributing Co.
209 N. Hawkins St.
Dallas 1

(TEXAS cont'd)
Roy A. Ribelin Distributing Co.
Houston 26

WASHINGTON
Durkin Chemical Co.
2605 2nd Ave.
Seattle 1

CANADA
Natural Products Corp.
738 Marin Avenue
Montreal

Metals Disintegrating Company, Inc.

CALIFORNIA
E. M. Walls Company
353 Sacramento Street
San Francisco
American Mineral Spirits Co., Western
P. O. Box 551
South Gate

COLORADO
George C. Brandt, Inc.
1940 Blake Street
Denver 2

GEORGIA
R. T. Hopkins Company
544 Means Street, N. W.
Atlanta 18

ILLINOIS
Daniel G. Hereley Company
1607 W. Howard Street
Chicago 26

KANSAS
George C. Brandt, Inc.
3150 Fiberglas Road
Kansas City 15

KENTUCKY
Lewis & Co. of Kentucky, Inc.
106 W. Main Street
Louisville 2

LOUISIANA
The Breffeilh Company
P. O. Box 13222
New Orleans 25

MASSACHUSETTS
The Truesdale Company
52 Cambridge Street
Boston 34

MICHIGAN
Quigley & Milke
16134 E. Warren Avenue
Detroit 24

MISSOURI
J. E. Niehaus & Co., Inc.
1375 S. Kings Highway
St. Louis

MINNESOTA
George C. Brandt, Inc.
739 Pillsbury Avenue
St. Paul 14

NEW JERSEY
American Mineral Spirits Co.
Mountain Avenue
Murray Hill

NEW YORK
American Weldrock Corp.
356 Elm Street
Buffalo 3

NORTH CAROLINA
Charles L. Burks & Co.
P. O. Box 1032
Black Mountain
Charles L. Burks & Co.
P. O. Box 1666
High Point

OHIO
The Paul Wiemer Company
2089 Sherman Avenue
Cincinnati 12
A. C. Mueller Company, Inc.
14625 Detroit Avenue
Cleveland 7

OREGON
Cordano Chemical Company
56 S. E. Belmont Street
Portland

PENNSYLVANIA
American Mineral Spirits Co.
P. O. Box 348
Conshohocken
Campbell Chemical Company
P. O. Box 486
Carnegie

TENNESSEE
John P. Sheahan Company
P. O. Box 2844
Memphis 2

TEXAS
W. W. Richerson Company
712 Unit 2 Santa Fe Building
Dallas 2
Roy A. Ribelin Distributing Co.
P. O. Box 21081
Houston 26

WASHINGTON
D. B. Smith Company
1016 First Avenue, South
Seattle 4

WISCONSIN
J. W. Copps, Inc.
333 W. Silver Spring Drive
Milwaukee 17

Mineral Pigments Corp.

CALIFORNIA
E. M. Walls Company
353 Sacramento Street
San Francisco 11

FLORIDA
Palmer Supplies Co. of Florida
66 N. E. 24th Street
P. O. Box 37-384
Miami 37

LOUISIANA
Thompson-Hayward Chemical Co.
P. O. Box 4068-Station F
New Orleans 18

MASSACHUSETTS
J. M. Washburn Co.
P. O. Box 121
Arlington 74

MICHIGAN
Skelton Chemical Co.
8830 West McNichols Road
Detroit 21
Krekel Goetz Sales & Supply Co.
302 Houseman Building
Grand Rapids 2

MINNESOTA
Thompson-Hayward Chemical Co.
909 Second Street, South
Minneapolis 16

MISSOURI
Ivan T. Bauman Company
817 N. Second Street
St. Louis 2

OHIO
S. S. Skelton Company
104 Lepper Road
Akron
S. S. Skelton Company
2775 Moreland Blvd., S. E.
Cleveland 20

PENNSYLVANIA
Van Horn, Metz & Co., Inc.
241 E. Elm Street
Conshohocken
Campbell Chemical Company
40 E. Main Street
P. O. Box 486
Carnegie

TEXAS
M.H. Cron
6015 Murphy Street
P. O. Box 14442
Houston

WASHINGTON
Durkin Chemicals, Inc.
2603 Second Avenue
Seattle 1

Minerals & Chemicals

CALIFORNIA
E. M. Wallis Company
353 Sacramento Street
San Francisco 11
Chemicals-Additives Company
3155 Leonis Boulevard
Vernon 58

COLORADO
George C. Brandt, Inc.
1940 Blake Street
Denver 2

FLORIDA
Gulf Coast Chemical Corp.
107-22nd Street
Belleair Beach
Indian Rocks
Gulf Coast Chemical Corp.
101 N. 12th Street
Tampa

GEORGIA
Southern States Chemical Co.
1061 W. Marietta St., N. W.
Box 2517, Station D
Atlanta

ILLINOIS
Commerce Petroleum Co.
2980 Archer Avenue
Chicago 8

INDIANA
Strohm Whse. & Cartage Co.
359 West Ray Street
Indianapolis 25

KANSAS
George C. Brandt, Inc.
3150 Fiberglas Road
Kansas City

KENTUCKY
Wm. B. Tabler Company
P. O. Box 1254
Louisville

LOUISIANA
Barada & Page, Inc.
Maple & Leake Avenues
New Orleans 18

MARYLAND
Van Horn, Metz & Co., Inc.
516 N. Charles St.
Baltimore 1

MASSACHUSETTS
T. C. Ashley & Company, Inc.
683 Atlantic Avenue
Boston 11

MICHIGAN
A. E. Fleming Company
1900 E. Jefferson Avenue
Detroit 7

MINNESOTA
George C. Brandt, Inc.
739 Pillsbury Avenue
St. Paul 14

MISSOURI
Barada & Page, Inc.
Foot of Destrehan Street
St. Louis 7

NEW YORK
James O. Meyers' Sons
290 Larkin Street
Buffalo 10
Superior Materials, Inc.
120 Liberty Street
New York 6

NORTH CAROLINA
Southern States Chemical Co.
1039 Bond Street
Charlotte

OHIO
C. L. Zimmerman Co.
Cincinnati Union Terminal
Cincinnati 3
A. C. Mueller Co., Inc.
14625 Detroit Avenue
Cleveland 7

OKLAHOMA
Barada & Page, Inc.
1700 West Grand Avenue
Oklahoma City
Barada & Page, Inc.
6550 East Skelly Drive
P. O. Box 4628
Tulsa 5

OREGON
Cordano Chemical Company
56 Southeast Belmont Street
Portland 1

PENNSYLVANIA
Van Horn, Metz & Co., Inc.
241 East Elm Street
Conshohocken
Van Horn, Metz & Co., Inc.
Coxcomb Hill Road
New Kensington

SOUTH CAROLINA
Southern States Chemical Co.
25 Peden Street
Greenville

TEXAS
Barada & Page, Inc.
3306 Borich Street
Dallas 10
Barada & Page, Inc.
Murphy Street
P. O. Box 14008
Houston 21

VIRGINIA
Van Horn, Metz & Co., Inc.
6101 Staples Mill Road
Richmond 28

WASHINGTON
D. B. Smith Company
1016 First Avenue South
Seattle 4

WISCONSIN
Commerce Industrial Chemicals, Inc.
6377 N. Teutonia Avenue
Milwaukee 9

CANADA
Mackenzie & Feimann Ltd.
970 Malkin Avenue
Vancouver 6
Drew, Brown Ltd.
5410 Ferrier Street
Drew, Brown Ltd.
50 Titan Road

Minnesota Linseed Oil Co.

CALIFORNIA
Wm. C. Loughlin Co.
311 California St.
San Francisco 4
National Lead Company
2240 - 24th St.
San Francisco 10
Stay & Day Paint Materials Co.
363 So. Mission Road
Los Angeles 33

ILLINOIS
National Lead Company
900 West 18th St.
Chicago 80

KENTUCKY
H. H. Benner Co.
803 Hoffman Bldg.
Louisville

MASSACHUSETTS
The Truesdale Co.
52 Cambridge St.
Allston 34

MICHIGAN
Baker & Collinson
12000 Mt. Elliott Ave.
Detroit 12

MISSOURI
Ivan T. Bauman Co.
817 No. Second St.
St. Louis 2

NEW JERSEY
Baldwin Oils & Commodities
320 - 12th St.
Jersey City 2
Tom McAdam, Inc.
103 Cornelia St.
Boonton

NEW YORK
National Lead Company
111 Broadway
New York 6

OHIO
The Dayton Oil Co.
P. O. Box 85, Station A
Dayton
Norman G. Schabel Co.
20950 Center Ridge Road
Cleveland 16

PENNSYLVANIA
Joseph A. Burns
124 Harrison Ave.
Pittsburgh 2

PENNSYLVANIA (cont'd)
National Lead Company
2607 E. Cumberland St.
Philadelphia

E. W. Kaufmann
P. O. Box 27
Flourtown

WASHINGTON
W. Ronald Benson Co.
820 First Ave. So.
Seattle

WISCONSIN
H. T Illing Co.
4200 W. Monarch Pl.
Milwaukee 8

Mixing Equipment Co., Inc.

CALIFORNIA
Frank J. Bunker
1088 So. LaBrea Ave.
Los Angeles 19
George R. Friederich & Co.
725 Tehama St.
San Francisco 3

COLORADO
Alldredge & McCabe
847 East 17th Ave.
Denver 18

FLORIDA
Johnson Roney II & Associates, Inc.
1136 Drew Street
P. O. Box 26
Clearwater

GEORGIA
Roy C. Crumbliss
15th Street - East Beach
P. O. Box 304
St. Simons Is.

ILLINOIS
Fuente & Webster, Inc.
549 W. Randolph St.
Chicago 6

INDIANA
Avels Sales & Engineering Co.
1407 East Riverside Dr.
Indianapolis 7

LOUISIANA
John H. Carter Co., Inc.
Supply Rd.
P. O. Box 1741
Oil Center Sta.
Lafayette
John H. Carter Co., Inc.
2551 Metairie Road
P. O. Box 9257
Metairie
John H. Carter Co., Inc.
201 Strand Bldg.
Shreveport

MARYLAND
Maleson Company
1547 Mathieson Bldg.
10 Light St.
Baltimore 2

MASSACHUSETTS
Chester C. Stewart
8 Beacon St.
Boston 8

MICHIGAN
William A. DaLee, Inc.
9190 Roselawn Ave.
Detroit 4

MINNESOTA
George R. Mellema Co.
620 Plymouth Bldg.
Minneapolis 3

MISSOURI
Allan Edwards, Inc.
1519 Cherry St.
Kansas City 8
Wharton L. Peters Machinery Co.
3863 West Pine Blvd.
St. Louis 8

NEW YORK
Bass Industrial Equipment Co., Inc.
6045 Main St.
P. O. Box 215, Williamsville Br.
Buffalo 21
Mixing Equipment Co., Inc.
136 Liberty St.
New York 6

NEW YOQK (cont'd)
Harold E. Colburn
82 St. Paul St.
Rochester 4

NORTH CAROLINA
Robert E. Mason & Co.
1726 Hutchison Ave.
P. O. Box 1903
Charlotte 1

OHIO
White Industrial Sales & Equipment Co.
919 Second National Bldg.
Akron 8
White Industrial Sales & Equipment Co.
140 West Sixth Street
Cincinnati 2
White Industrial Sales & Equipment Co.
3639 Lee Road
Cleveland 20

OKLAHOMA
Allan Edwards, Inc.
2445 So. Jackson
P. O. Box 7218
Tulsa

OREGON
The Burhans-Sharpe Co.
Weatherly Bldg.
516 S. E. Morrison St.
Portland, 14

PENNSYLVANIA
Maleson Co.
225 N. 32nd St.
Philadelphia 4
White Industrial Sales & Equipment Co.
612 Farmers Bank Bldg.
Pittsburgh 22

TENNESSEE
Edgar A. Rogers
Chattanooga Bank Bldg
Chattanooga 2
C. W. Dean and Associates
4711 Poplar Ave.
Memphis 17

TEXAS
Allan Edwards, Inc.
6979 Bob-O-Link Dr.
P. O. Box 9585
Dallas 14
M. N. Dannenbaum Co.
2421 So. Wayside Dr.
P. O. Box 14496
Houston 21

UTAH
Nibley & Company
707 Deseret Bldg.
73 So. Main St.
Salt Lake City 11

VIRGINIA
O'Neill Pump & Engineering Co.
601 East Franklin St.
Richmond 19

WASHINGTON
The Burhans-Sharpe Co.
1731 First Ave. So.
Seattle 4

WEST VIRGINIA
White Industrial Sales & Equipment Co.
1033 Quarrier Bldg.
Charleston 1

Naftone, Inc.

CALIFORNIA
John K. Bice Co.
440 Seaton Street
Los Angeles 13

E. B. Taylor Company
Los Angeles 13

COLORADO
L. H. Herr Company
Interstate Trust Building
Denver 2

FLORIDA
Palmer Supplies Company
211 East Robinson Avenue
Orlando

GEORGIA
Charles E. Baker, Inc.
1158 Avon Avenue, S.W.
Atlanta

ILLINOIS
Donald R. Fitzgerald Co.
5875 N. Lincoln Avenue
Chicago 45

KENTUCKY
C. L. McGuire and Co.
137 St. Matthews Avenue
Louisville 7

LOUISIANA
Breffeilh Co.
P. O. Box 13222
New Orleans 25

MARYLAND
The Warner-Graham Co.
President & Fawn Sts.
Baltimore

MASSACHUSETTS
R. B. Huber, Sales Engineer
216 Tremont Street
Boston 16

MICHIGAN
Theo. F. Gehle Co.
603 Fisher Building
Detroit 2

MINNESOTA
Hawkins Chemical, Inc.
3100 E. Hennepin Avenue
Minneapolis 13

MISSOURI
Ack Sales Company
901 E. 13th Avenue
North Kansas City 16
Harry A. Baumstark & Company
6801 Hoffman Avenue
St. Louis 9

NEW YORK
John H. Calo Co., Inc.
19 Rector Street
New York 6

OHIO
Deeks & Co.
6433 Wiehe Road, Golf Manor
Cincinnati 13
Norman G. Schabel Co.
20950 Center Ridge Road
Cleveland 16

OREGON
Van Waters & Rogers, Inc.
3950 N. W. Yeon Avenue
Portland

PENNSYLVANIA
John J. McCullion
2615 Est Westmor eland Street
Philadelphia 34
J. C. Ackerman Co.
Penn-Lincoln Hotel
Pittsburgh 21

TENNESSEE
Delhi Sales
6255 Front St.
Memphis

TEXAS
Southwest Sales Co., Inc.
2400-2420 Coombs Street
Dallas
The E. B. McCullough Co.
2301 Commerce Street
Houston

WASHINGTON
Van Waters & Rogers, Inc.
4000 First Avenue

Neville Chemical Company

CALIFORNIA
Paul W. Wood Co.
2600 S. Eastern Ave.
Los Angeles 22
H. M. Royal, Inc.
11911 Woodruff Ave.
Los Angeles
Paul W. Wood Co.
350 Townsend St.
San Francisco 7

DELAWARE
George Senn, Inc.
Philadelphia 34

ILLINOIS
Donald R. Fitzgerald Co.
5875 North Lincoln Ave.
Chicago 45
O'Connor & Co.
4667 North Manor Ave.
Chicago 25

INDIANA
Harold C. Hall
Cincinnati 27

MARYLAND
George Senn, Inc.
Philadelphia 34, Pa.

MASSACHUSETTS
T. C. Ashley & Co., Inc.
683 Atlantic Ave.
Boston 11

MICHIGAN
O'Connor Chemicals Co.
10586 Knodell St.
Detroit 13
Krekel-Goetz Sales & Supply
302 Houseman Bldg.
Grand Rapids 2

MINNESOTA
P. E. Calo Co.
6518 Walker St.
Minneapolis 26

MISSOURI
Clifford L. Iorns Co.
216 South 7th St.
St. Louis 2

MISSOURI (Cont'd)
Morton-Meyers Co.
220 E. Missouri Ave.
Kansas City 6

NEW JERSEY
R. E. Carroll, Inc.
230-33 Broad St. Bank
Trenton 1

NEW YORK
Commercial Chemicals, Inc.
211 Hertel Ave.
Buffalo 7
John H. Calo Co.
19 Rector Street
New York 6

OHIO
E. P. Lambert Co.
First National Tower
Akron
Harold C. Hall
Mariemont Hotel Bldg.
Cincinnati 27
Ducros & Co.
3542 Lee Road
Cleveland 20

PENNSYLVANIA
George Senn, Inc.
2200 E. Westmoreland Ave.
Philadelphia 34

TEXAS
W. W. Richardson Co.
712 Unit 2, Santa Fe Bldg.
Dallas 2
E. B. McCullough Co.
1503 Haden Rd.
Green's Bayour
Houston 2

WISCONSIN
Donald R. Fitzgerald Co.
Chicago 45, Ill.

CANADA
Bate Chemical Corp., Ltd.
5165 Sherbrooke St., West
Canadian Mineral Spirits Co., Co.
P. O. Box 53, Station R
Toronto

The New Jersey Zinc Company

OREGON
Van Waters & Rogers, Inc.
3950 N. W. Yeon Avenue
Portland 10

TEXAS
Van Waters & Rogers, Inc.
10216 Denton Road
Dallas

Van Waters & Rogers, Inc.
2316 Portsmouth Street
Houston

WASHINGTON
Van Waters & Rogers, Inc.
4000 First Ave., South
Seattle 4
Van Waters & Rogers, Inc.
North 809 Washington Street
Spokane 1

CANADA
St. Lawrence Chemical Company, Ltd.
5405 Pare Street
Montreal 16

Newport Industries Company

ALABAMA
Hulsey Brokerage Company
115 South 35th Street
Birmingham

CALIFORNIA
S. L. Abbot Company
4255 District Blvd.
Los Angeles 58
S. L. Abbot Company
135 King Street
San Francisco

COLORADO
George C. Brandt, Inc.
1940 Blake Street
Denver 2

GEORGIA
Southern States Chemical Co.
1061 W. Marietta St. N. W.
Atlanta 18

INDIANA
The August Hoffman Company
P. O. Box 41115
Indianapolis 41

KANSAS
George C. Brandt, Inc.
3150 Fibreglas Road
Kansas City 15

KENTUCKY
Lewis & Company
102 W. Main Street
Louisville

MARYLAND
The Warner-Graham Company
President & Fawn Streets
Baltimore 2

MASSACHUSETTS
Mulcahy & Griffin, Inc.
141 Milk Street
Boston 9

MICHIGAN
Baker & Collinson
12000 Mt. Elliott Avenue
Detroit 12

MINNESOTA
George C. Brandt, Inc.
3419 Pillsbury Avenue
St. Paul

MISSOURI
J. E. Niehaus & Co., Inc.
3419 Gratiot Street
St. Louis 3

NEW YORK
Ritter Chemical Company
Amsterdam
James O. Meyers' Sons
290 Larkin Street
Buffalo 10

NORTH CAROLINA
F. H. Ross Company
2802 Patterson Ave.
Greensboro
F. H. Ross Company
1649 W. Morehead St.
Charlotte

OHIO
J. H. Hinz Company
405 Rockefeller Bldg.
Cleveland 13

OREGON
Van Waters & Rogers, Inc.
3950 N. W. Yeon Avenue
Portland 10

PENNSYLVANIA
John D. Butts
Grant Building
Pittsburgh 19

TENNESSEE
Post Brokerage Company
814 10th Avenue North
Nashville

TEXAS
Roy A. Ribelin Dist. Co.
209 North Hawkins
Dallas 26
Roy A. Ribelin Dist. Co.
570A M & M Building
Houston

WASHINGTON
Van Waters & Rogers, Inc.
4000 First Avenue, South
Seattle 4

WEST VIRGINIA
Williamson Paint Co.
Charleston

Nopco Chemical Co.

KENTUCKY
Wm. B. Tabler Co.
P. O. Box 1254
Louisville

MARYLAND
W. R. McClayton
1126 Mondawmin Concourse
Baltimore

NEW YORK
Superior Materials, Inc.
120 Liberty St.
New York, N. Y.

OHIO
Harwick Standard Chemical Co.
60 South Seiberling St.
Akron

Norcross Corporation

CALIFORNIA
Jensen Instrument Co.
1919 Beverly Boulevard
Los Angeles 57
Jensen Instrument Co.
429 Bryant Street
San Francisco 7

ILLINOIS
J. B. McMahon
332 South Michigan Ave.
Chicago 4

MICHIGAN
King Sales Corporation
12638 Woodrow Wilson Avenue
Detroit 28

NEW YORK
Murphy & Morse
P. O. Box 2717
Buffalo 26

OHIO
King Instrument Co.
P. O. Box 7283
Cleveland 29

OHIO (Cont'd)
B. C. Engineering Co.
P. O. Box 34
Cincinnati 36

PENNSYLVANIA
King Instrument Co.
P. O. Box 10387
Pittsburgh 34

TEXAS
Petro-Chem Equipment Co.
3513 West Dallas Avenue
Houston 19

WISCONSIN
Pyro-matic Industrials
500 W. National Avenue
Milwaukee 15

CANADA
W. J. Westaway Co., Ltd.
Main & MacNab Streets
Hamilton, Ontario
W. J. Westaway Co., Ltd.
7335 St. Lawrence Blvd.
Montreal, Quebec

Nuodex Products Company

ARKANSAS
Thompson-Hayward Chemical Co.
P. O. Box 85, Asher Ave. Station
3100 W. 65th Street
Little Rock

CALIFORNIA
Cole & De Graf
656 Townsend Street
San Francisco 3

COLORADO
Thompson-Hayward Chemical Co.
1501 West 13th Street
Denver 2

GEORGIA
R. T. Hopkins Company
544 Means Street, N. W.
Atlanta 18

ILLINOIS
J. W. Van Tuin Company
5844 No. Lincoln Avenue
Chicago 45

INDIANA
Indiana Naval Stores Co.
P. O. Box 791
401-09 West 17th Street
Indianapolis

IOWA
Thompson-Hayward Chemical Co.
P. O. Box 176
802 Fishertown Road
Davenport
Thompson-Hayward Chemical Co.
Southwest First and Granger
Des Moines 15

KANSAS
Thompson-Hayward Chemical Co.
727 East Osie Street, Box 2897
South Wichita Station
Wichita 2

KENTUCKY
The Argus Company, Inc.
305 Madrid Building
Louisville 2

LOUISIANA
Thompson-Hayward Chemical Co.
P. O. Box 4068, Station F
New Orleans 18

MARYLAND
Leidy Chemicals Corp.
920 South Eutaw Street
Baltimore

MASSACHUSETTS
D. H. Litter Co., Inc.
291 No. Harvard Street
Allston 34

MICHIGAN
Baker & Collinson, Inc.
12000 Mt. Elliott Avenue
Detroit 12

MINNESOTA
Thompson-Hayward Chemical Co.
909 Second Street, S.
Minneapolis 15

MISSOURI
Abner Hood Chemical Co.
507-17 N. Montgall Avenue
Kansas City 20

J. E. Niehaus & Co., Inc.
3419 Gratiot Street
St. Louis 3

NEBRASKA
Thompson-Hayward Chemical Co.
1110 S. 4th St.
Omaha 8

NEW YORK
Commercial Chemicals, Inc.
211 Hertel Avenue
Buffalo 7

D. H. Litter Co., Inc.
116 East 16th Street
New York 3

OHIO
B. H. Roettker Co.
3732 Lovell Avenue
Cincinnati 11

A. C. Mueller Co., Inc.
616 St. Clair Avenue, N. E.
Cleveland 14

OKLAHOMA
Thompson-Hayward Chemical Co.
P. O. Box 10008
Southwest Station
3909 So. Meridian Avenue
Oklahoma City 19

Thompson-Hayward Chemical Co.
36 N. Guthrie Street
Tulsa 3

OREGON
Fred E. Alsop & Co.
935 N. W. Twelfth Avenue
Portland 9

PENNSYLVANIA
Harry W. Gaffney
1510 Girard Trust Bldg.
Philadelphia 2

John D. Butts
926 Grant Building
Pittsburgh 19

TENNESSEE
Thompson-Hayward Chemical Co.
493 North Front Street
Memphis
Post Brokerage Company
P. O. Box 277
814 10th Avenue N.
Nashville 2

TEXAS
Thompson-Hayward Chemical Co.
P. O. Box 6226, 2627 Weir Street
Dallas 1

Thompson-Hayward Chemical Co.
P. O. Box 4557, 1701 Oliver Street
Houston 13

Thompson-Hayward Chemical Co.
Grayston Sta., P. O. Box 126
San Antonio

VIRGINIA
F. V. Gunn & Company, Inc.
301 E. Franklin Street
P. O. Box 5354
Richmond 20

WASHINGTON
D. B. Smith Company
1016 First Avenue S.
Seattle 4

WISCONSIN
R. L. Ferguson
229 E. Wisconsin Avenue
Milwaukee 2

Pacific Vegetable Oil Corp.

GEORGIA
G. R. Nottingham, Inc.
1257 Chattahoochee Ave., N.W.
Atlanta

ILLINOIS
Daniel G. Hereley Company
1607 Howard Street
Chicago

KENTUCKY
The Argus Company
305 Madrid Building
Louisville

MASSACHUSETTS
R. B. Huber
216 Tremont Street
Boston

MICHIGAN
George E. Moser & Sons, Inc.
17332 Shields Ave.
Detroit 12

MINNESOTA
Horton-Earl Company
6127 Excelsior Blvd.
Minneapolis 16

MISSOURI
Ack Sales Company
901 East 13th Avenue
North Kansas City 16
Ivan T. Bauman Company
817 North Second Street
St. Louis

OHIO
Donald McKay Smith Company
966 Hanna Building
Cleveland

OREGON
W. Ronald Benson, Inc.
2505 S. E. 11th Street
Portland

PENNSYLVANIA
Baker Industrial Oils Co.
18 W. Chelton Ave.
Philadelphia

TEXAS
Joe Coulson Co.
6015 Murphy Ave.
Houston

WASHINGTON
W. Ronald Benson, Inc.
820 First Avenue South
Seattle

WISCONSIN
J. W. Copps
333 W. Silver Springs Dr.
Milwaukee 17

CANADA
B. & S. H. Thompson & Co.
651 Notre Dame St. West
Montreal

B. & S. H. Thompson & Co.
137 Wellington St. West
Toronto

Patterson Foundry & Machine Co.

CALIFORNIA
M. O. Grove & Company
310 Sacramento Street
San Francisco 11

COLORADO
Horblit & Company
2329 Champa Street
Denver 5

GEORGIA
I. W. Benson
927 Fulton Federal Bldg.
Atlanta 3

PENNSYLVANIA
Harlan W. Henszey
1623 Widener Building
Philadelphia 7

C. H. Rust
295 Beverly Road
Pittsburgh 16

TEXAS
Gulf States Engineers, Inc.
2226 Bissonnet Street
Houston 5

WASHINGTON
Durkin Chemical Company
2605 Second Avenue
Seattle 1

Pennsylvania Color & Chemical Company

CALIFORNIA
Horn, Jefferys & Co.
20 W. Burbank Blvd.
Burbank

ILLINOIS
D. G. Hereley Co.
1607 Howard St.
Chicago

MASSACHUSETTS
R. B. Huber
216 Tremont St.
Boston 16

OHIO
T. C. Kiesel
P. O. Box 93
Cincinnati 13

A. C. Mueller Co., Inc.
14625 Detroit Ave.
Cleveland 7

WISCONSIN
J. W. Copps, Inc.
333 W. Silversprings Dr.
Milwaukee 17

Pennsylvania Industrial Chemical Corp.

CANADA
Charles B. Tennant & Co., Ltd.
Room 400
6555 Cote Des Neiges Road
Montreal 26, Quebec

Charles B. Tennant & Co., Ltd.
1303 Yonge Street
Toronto 7, Ontario
Charles B. Tennant & Co., Ltd.
1369 Richards Street
Vancouver 2, B. C.

Petrometer Corp.

CALIFORNIA
L. J. Prues Associates
5445 E. Beverly Blvd.
Los Angeles 22

ILLINOIS
Storrely & Orlebeke
605 W. Washington Blvd.
Chicago 6

IOWA
William W. Stuart
3609 Wakonda Drive
Des Moines 21

LOUISIANA
D. A. Warriner Instrument Sales & Service
7920 Zimple Street
New Orleans 18

MAINE
Gould Equipment Co.
P. O. Box 1611
Portland

MASSACHUSETTS
Boston Draft Control Co.
65 Tenean Street
Boston 22

MINNESOTA
M. H. Baker Co.
109 Portland Ave.
Minneapolis 1

NEW YORK
Mercury Sales Co.
Empire Bldg.
Syracuse 2

OHIO
Fischer Industrial Equipment Co.
6851 Plainfield Road
Cincinnati 36

PENNSYLVANIA
Frederic S. Bartlett
55 Cricket Ave.
Ardmore

Flow Engineering, Inc.
P. O. Box 476
Flourtown

TENNESSEE
Air Equipment Engineers
5809 Westover Drive
Knoxville

WASHINGTON
William A. Crowder
2621 W. Boston St.
Seattle 99

Union Iron Works
P. O. Box 2135
Spokane 10

Pfister Chemical Works

RHODE ISLAND
Amer. Chemical & Solvent Co.
15 Westminister Street
Providence

Raybo Chemical Company

CALIFORNIA
L. H. Butcher Company
3628 East Olympic Blvd.
Los Angeles 23
L. H. Butcher Company
15th & Vermont Street
San Francisco 1

FLORIDA
Palmer Supply Co.
4471 N. W. 36th St.
Miami Springs
Palmer Supply Co.
211 E. Robinson Ave.
P. O. Box 784
Orlando

ILLINOIS
Fred A. Jensen & Associates
510 North Dearborn Street
Chicago 10

KENTUCKY
Wm. B. Tabler Company
P. O. Box 1254
Louisville 1

LOUISIANA
Roy T. Cucullu Company
307 Barrone Bldg.
New Orleans 22

MARYLAND
G. T. Weiss, Inc.
P. O. Box 6980
Baltimore 16

MASSACHUSETTS
Truesdale, Inc.
52 Cambridge St.
Allston 34

MICHIGAN
J. W. Stark Company
20052 Livernois
Detroit 21

MISSOURI
Ack Sales Company
901 East 13th Avenue
North Kansas City 16

Ivan T. Bauman Co.
817 North Second Street
St. Louis 2

NEW YORK
Superior Materials, Inc.
120 Liberty Street
New York 6

James O. Meyers, Sons,
290 Larkan St.
Buffalo 10

OREGON
L. H. Butcher Company
2750 N. W. 31 Avenue
Portland 10

PENNSYLVANIA
Harwood J. Cranston
Rural Route No. 2-Box 48A
Sewickley

TEXAS
W. W. Richarson Company
712 Unit 2 Sante Fe Bldg.
Dallas 2

UTAH
L. H. Butcher Company
407 West 17th South Street
Salt Lake City 15

WASHINGTON
L. H. Butcher Company
5601 1st Ave., S.
Seattle

CANADA
Charles Tennant & Co. Ltd.
1303 Yonge Street
Toronto, Ontario

Charles Tennant & Co. Ltd.
6555 Cote des Neiges Road
Montreal, Quebec

Charles Tennant & Co. Ltd.
1396 Richards St.
Vancouver, British Columbia

R. L. Sayer
70 Marion Street
Norwood, Winnipeg, Manitoba

Reichard-Coulston, Inc.

CALIFORNIA
Dorsett & Jackson, Inc.
840 East 60th Street
Los Angeles 1
Carmona Chemical Co.
1001 Seventeenth St.
San Francisco 7

FLORIDA
Mr. A. J. Passonno
107-22nd St., Belleair Beach
Indian Rock Beach P. O.
Mr. A. J. Passonno
Star Terminal & Whse. Co.
101 North 12th St., Tampa.

GEORGIA
Mr. A. J. Passonno
Southern Bonded Whse.
367 John St., N. W. Atlanta

INDIANA
Indiana Naval Stores Co.
403 West 17th Street
Indianapolis 2

KENTUCKY
The L. A. Miller Co.
314 Republic Building
Louisville 2

LOUISIANA
Griffith-Mehaffey Co., Inc.
640 S. Front St.
New Orleans 12

MICHIGAN
Baker & Collinson, Inc.
12000 Mt. Elliott Ave.
Detroit 12

MINNESOTA
Horton-Earl Co.
6127 Excelsior Blvd.,
Minneapolis 16

MISSOURI
Morton-Myers Co.
220 E. Missouri Ave.
Kansas City 6

NEW JERSEY
H. M. Royal, Inc.
689 Pennington Ave.
Trenton 1

OHIO
Deeks & Co.
6433 Wiehe Road Golf Manor
Cincinnati 13

Henry L. Grund, Inc.
736 Bulkley Bldg.
Cleveland 15

OREGON
Van Waters & Rogers, Inc.
3950 N. W. Yeon Avenue
Portland 10

PENNSYLVANIA
John D. Butts
Grant Building
Pittsburgh 19

TEXAS
Thompson-Hayward Chemical Co.
P. O. Box 4557
Houston 13

WASHINGTON
Van Waters & Rogers, Inc.
4000 First Avenue South
Seattle 4

Reichhold Chemicals, Inc.

COLORADO
George C. Brandt, Inc.
1940 Blake St.
Denver 2

GEORGIA
Deeks & Company
186 Rio Circle
Decatur

HAWAII
Chester R. Owen
P. O. Box 1320
1292 Kapiolani Blvd.
Honolulu

MINNESOTA
George C. Brandt, Inc.
739 Pillsbury Avenue
St. Paul 14

NEW YORK
C. Withington Co.
47-40 5th Street
Long Island City 1

NORTH CAROLINA
Deeks & Company
P. O. Box 565
High Point

OHIO
Deeks & Company
6433 Wiehe Road
Cincinnati 13

Reynolds Metals Co.

ARKANSAS
Thompson-Hayward Chemical Company
3100 West 65th Street
P. O. Box 85 Asher Ave. Station
Little Rock

CALIFORNIA
L. H. Butcher Company
3628 East Olympic Boulevard
Los Angeles 23
L. H. Butcher Company
15th & Vermont Streets
San Francisco

COLORADO
Thompson-Hayward Chemical Company
1501 West 13th Avenue
Denver 4

GEORGIA
George E. Missbach & Co.
705 Henry Grady Building
Atlanta

ILLINOIS
The Leward Company
9 South Clinton Street
Chicago 6

INDIANA
Indiana Naval Stores
401-409 West 17th Street
Indianapolis 2

IOWA
Thompson-Hayward Chemical Company
2040 West River Street
Davenport
Thompson-Hayward Chemical Company
S. W. First & Granger Avenues
Des Moines 15

KANSAS
Thompson-Hayward Chemical Company
727 East Osie Street
Wichita 11

KENTUCKY
H. H. Benner Company
Commonwealth Building
Fourth & Broadway
Louisville 2

LOUISIANA
Thompson-Hayward Chemical Company
P. O. Box 4068, Station F
New Orleans 18

MARYLAND
A. B. Kohl Sales Company
4615 Edmondson Street
Baltimore 29

MASSACHUSETTS
Eastern Chemicals, Inc.
Westfield

MICHIGAN
Matteson-Van Wey, Inc.
16901 West Eight Mile Road
Detroit 35

MINNESOTA
Thompson-Hayward Chemical Company
909 Second Street South
Minneapolis 15

MISSOURI
Thompson-Hayward Chemical Company
2915 Southwest Boulevard
Kansas City 8
Thompson-Hayward Chem. Co.
No. 5 Carr Street
St. Louis 2

NEBRASKA
Thompson-Hayward Chemical Company
1100 South Fourth Street
Omaha 8

NEW YORK
John H. Calo Company
19 Rector Street
New York 6
Eastern Chemicals, Inc.
South Street
Renssalaer 25

Eastern Chemicals, Inc.
103 N. Beach Street
Syracuse

James O. Meyers' Sons
290 Larkin St. - Wilson Warehouse
Buffalo 10

OHIO
H. L. Grund, Inc.
406 Bulkley Building
Cleveland 15

C. L. Zimmerman Company
N-303 Cincinnati Union Terminal
Cincinnati 3

OKLAHOMA
Thompson-Hayward Chemical Company
3909 South Meridian
P. O. Box 10008 Southwest Sta.
Oklahoma City 19

Thompson-Hayward Chemical Company
36 North Guthrie Street
Tulsa 3

OREGON
L. H. Butcher Company
2750 N. W. 31st Avenue
Portland 10

PENNSYLVANIA
Loos & Dilworth, Inc.
722 South Swanson Street
Philadelphia

E. E. Zimmerman Company
1704 Keenan Building
Pittsburgh 22

TENNESSEE
Thompson-Hayward Chemical Company
1585 Harbor Avenue
Memphis 1

TEXAS
Thompson-Hayward Chemical Company
P. O. Box 6226
Dallas 1

Thompson-Hayward Chemical Company
P. O. Box 4557
Houston

Thompson-Hayward Chemical Company
222 Sequin Street
San Antonio

UTAH
L. H. Butcher Company
407 West 17th South Street
Salt Lake City 15

WASHINGTON
L. K. Butcher Company
1703 Sixth Avenue South
Seattle 4

WISCONSIN
R. L. Ferguson Company
718 Railway Exchange Building
Milwaukee 2

St. Joseph Lead Company

ALABAMA
Harwick Standard Chemical Co.
Box 428
Albertville

ARKANSAS
Thompson-Hayward Chemical Co.
3100 W. 65th St.
Little Rock

CALIFORNIA
Harwick Standard Chemical Co. of Calif.
1248 Wholesale St.
Los Angeles 21
L. H. Butcher Co.
15th & Vermont Sts.
San Francisco 1

COLORADO
Application Engineers, Inc.
2150 South Bellaire St.
Denver 22

FLORIDA
C. Withington Co., Inc.
1641 Landon Ave.
Jacksonville

ILLINOIS
Fred A. Jensen & Associates
510 N. Dearborn St.
Chicago 10

KANSAS
Thompson-Hayward Chemical Co.
727 E. Osie
Wichita 2

MARYLAND
William McGill
237 President St.
Baltimore 2

MASSACHUSETTS
Harwick Standard Chemical Co. of Mass., Inc.
661 Boylston St.
Boston 16

MICHIGAN
Matteson-VanWey, Inc.
16901 W. Eight Mile Road
Detroit 35

MINNESOTA
George C. Brandt, Inc.
739 Pillsbury Ave.
St. Paul 14

MISSOURI
Thompson-Hayward Chemica Co.
2915 Southwest Blvd.
Kansas City 8
J. E. Niehaus & Co., Inc.
1375 So. Kingshighway
St. Louis

NEBRASKA
Thompson-Hayward Chemical Co.
1110 So. 4th St.
Omaha 8

NEW JERSEY
R. E. Carroll, Inc.
230 Broad Street Bank Bldg.
Trenton 1

NEW YORK
James O. Meyers' Sons
290 Larkin St.
Buffalo 10
C. Withington Co., Inc.
47-40 Fifth St.
Long Island City 1

OHIO
Harwick Standard Chemical Co.
60 S. Seiberling St.
Akron 5
C. L. Zimmerman Co.
N-303 Cincinnati Union Terminal
Cincinnati 3

OKLAHOMA
Thompson-Hayward Chemical Co.
3909 S. Meridian Ave.
Oklahoma City 19
Thompson-Hayward Chemical Co.
36 N. Guthrie
Tulsa 3

OREGON
Cordano Chemical Co.
56 S. E. Belmont St.
Portland 1

PENNSYLVANIA
Van Horn, Metz & Co., Inc.
241 E. Elm St.
Conshohocken
Mr. R. L. Weaton
St. Joseph Lead Co.
Monaca 7

SOUTH CAROLINA
Harwick Standard Chemical Co.
P. O. Box 746
Greenville

TENNESSEE
Thompson-Hayward Chemical Co.
1585 Harbor Ave.
Memphis

TEXAS
Thompson-Hayward Chemical Co.
2627 Weir St.
Dallas 1
Thompson-Hayward Chemical Co.
1701 Oliver St.
Houston 13
Thompson-Hayward Chemical Co.
222 Seguin St.
San Antonio

WASHINGTON
Great Western Chemical Co.
6900 Fox Ave.
Seattle 8

WEST VIRGINIA
The Cabell Chemical Co.
101 22nd Street
Huntington 3

Sandoz, Inc.

CALIFORNIA
Martin Hoyt & Milne
Merchants Exchange Building
San Francisco
Martin Hoyt & Milne
906 E. Third Street
Los Angeles

Claude B. Schneible Co.

CALIFORNIA
Martin Hoyt & Milne
Merchants Exchange Building
San Francisco
Martin Hoyt & Milne
906 E. Third Street
Los Angeles

Shawinigan Resins Corp.

OREGON
W. Ronald Benson
2505 S. E. 11th Street
Portland 2

WASHINGTON
W. Ronald Benson
820 First Avenue South
Seattle 4

Silberline Manufacturing Company, Inc.

CALIFORNIA
R. E. Flatow & Co., Inc.
10 Madison Street
P. O. Box 1166
Oakland 4
E. B. Taylor Co.
442 Colyton Street
Los Angeles 13

GEORGIA
Deeks & Company
186 Rio Circle
Decatur

ILLINOIS
Carl Lechner, Inc.
1515 West Howard Street
Chicago 26

KENTUCKY
Wm. B. Tabler Company
P. O. Box 1254
Louisville 1

LOUISIANA
Lastrapes Bros.
322 Board of Trade Arcade
New Orleans 12

MASSACHUSETTS
R. T. Freeman Company
Hingham Industrial Center
Hingham

MICHIGAN
George B. Horsfull
1353 Whittier Road
Grosse Pointe 30

MINNESOTA
Horton-Earl Company
6127 Excelsior Blvd.
Minneapolis 16

MISSOURI
Ack Sales Company
P. O. Box 31
901 13th Ave.
Kansas City 16
Clifford L. Iorns Co.
216 South Seventh Street
St. Louis 2

NEW YORK
Henry M. Baer
210 Fifth Avenue
New York 10

OHIO
Ducros & Company
3592 Lee Road
Shaker Heights 20

NORTH CAROLINA
Deeks & Company
P. O. Box 565
High Point

PENNSYLVANIA
Joseph A. Burns & Son
124 Harrison Ave.
Pittsburgh 2
A. C. Hurlbrink
3701 North Broad Street
Philadelphia

TEXAS
E. B. McCullough
1503 Haden Road
Greens Bayou
P. O. Box 9794
Houston 15

J. Lee Smith & Company, Inc.

CALIFORNIA
A. J. Lynch & Co.
San Francisco 24
E. B. Taylor Co.
Los Angeles 13

COLORADO
L. H. Herr Co.
Denver 2

GEORGIA
Geo. E. Missbach & Co.
Atlanta 3

ILLINOIS
Fred A. Jensen & Associates
Chicago 10

KENTUCKY
The Argus Co., Inc.
Louisville 2

LOUISIANA
Russell Chemical Co.
New Orleans

MARYLAND
A. B. Kohl Sales Co.
Baltimore 29

MASSACHUSETTS
Barrett & Breen Co.
Boston 10

MICHIGAN
Theo. F. Gehle Co.
Detroit 2

MINNESOTA
Worum Chemical Co.
St. Paul 14

MISSOURI
H. R. Hamberg Co.
St. Louis 5
Thompson-Hayward Chemical Co.
Kansas City 8

NEW YORK
James O. Meyers' Sons
Buffalo 10

OHIO
A. C. Mueller Co., Inc.
Cleveland 7
The Paul Wiemer Co.
Cincinnati 12

OREGON
Great Western Chemical Co.
Portland 10

PENNSYLVANIA
Joseph A. Burns & Son
Pittsburgh 2
A. C. Hurlbrink
Philadelphia 40

TEXAS
JaRo-Chem, Inc.
Dallas 7
JaRo-Chem, Inc.
Houston 19

WASHINGTON
L. H. Butcher Co.
Seattle 4

CANADA
Chas. Tennant & Co., Ltd.
Montreal 26, Quebec
Chas. Tennant & Co., Ltd.
Toronto 7, Ontario

Southern California Minerals Company

CALIFORNIA
John K. Bice Company
440 Seaton
Los Angeles
A. J. Lynch & Company
2424 Blanding
Alameda

MISSOURI
G. S. Robins & Co.
126 Chouteau
St. Louis 2

NEW YORK
Whittaker, Clark & Daniels, Inc.
100 Church Street
New York 7

OREGON
Great Western Chemical Co.
3720 N. W. Yeon Avenue
Portland 10

TEXAS
Roy Ribelin Distrib. Co.
207 N. Hawkins
Dallas Distrib. Co.

Roy Ribelin
P. O. Box 21081
Houston

WASHINGTON
Great Western Chemical Co.
6921 E. Marginal Way
Seattle 8

Southern Clays, Inc.

CALIFORNIA
B. E. Dougherty & Co.
1807 Olympic Blvd.
Los Angeles
E. B. Taylor Co.
442 Colyton St.
Los Angeles

ILLINOIS
Kraft Chemical Co.
917 W. 18th St.
Chicago

KENTUCKY
C. L. McGuire & Co.
137 St. Matthews Ave.
Louisville

MASSACHUSETTS
Barrett & Breen
80 Federal St.
Boston

MISSOURI
Ack Sales Co.
901 E. 13th St.
No. Kansas City

NEW YORK
Jesse S. Young Co.
11 West 42nd St.
New York

NORTH CAROLINA
F. H. Ross & Co.
3930 Glenwood Dr.
Charlotte

OHIO
Ducros & Co.
3617 Lee Road
Shaker Heights

PENNSYLVANIA
Charles A. Wagner Co.
4455 No. Sixth St.
Philadelphia

TEXAS
Joe Coulson Co.
6015 Murphy Ave.
Houston
Southwest Sales Co.
2420 Coombs St.
Dallas

Southwestern Steel Containers Co.

TEXAS
S. Riekes & Sons
3314 Meadow Street
Dallas 15
Lehman-Phillips Company
2550 Glendale Avenue
Fort Worth
Joe Coulson Company
6015 Murphy Avenue
Houston 21

Sprayon Products, Inc.

CALIFORNIA
Bergdahl Associates
1485 Bayshore Boulevard
San Francisco

Standard Ultramarine & Color Company

CALIFORNIA
Paul W. Wood Company
350 Townsend Street
San Francisco 7

Paul W. Wood Company
P. O. Box 6797
2600 South Eastern Ave.
Los Angeles 22

COLORADO
Thompson-Hayward Chemical Co.
1501 West 13th Avenue
Denver

IOWA
Thompson-Hayward Chemical Co.
802 Fishertown Road
P. O. Box 176
Davenport

Thompson-Hayward Chemical Co.
Southwest First and Granger
Des Moines 15

KANSAS
Thompson-Hayward Chemical Co.
727 East Osie Street
Wichita 2

MASSACHUSETTS
L. E. Crossley
Room 318—176 Federal Street
Boston

MINNESOTA
Willard N. Swanson Co.
1015 North Third Street
Minneapolis 1

MISSOURI
Thompson-Hayward Chemical Co.
P. O. Box 768
29th & Southwest Blvd.
Kansas City 8

NEBRASKA
Thompson-Hayward Chemical Co.
1110 South 4th Street
Omaha 8

OKLAHOMA
Thompson-Hayward Chemical Co.
3909 S. Meridian Ave.
P. O. Box 10008 S. W. Sta.
Oklahoma City 19
Thompson-Hayward Chemical Co.
36 North Guthrie Street
Tulsa 3

OHIO
J. C. Drouillard Co.
264-66 Rockefeller Bldg.
Cleveland 13

PENNSYLVANIA
Jos. A. Burns & Son
124 Harrison Avenue
Pittsburgh 2

TEXAS
Thompson-Hayward Chemical Co.
P. O. Box 6226
2627 Weir Street
Dallas
Thompson-Hayward Chemical Co.
P. O. Box 4557
1701 Oliver Street
Houston
Thompson-Hayward Chemical Co.
P. O. Box 323
Lubbock
Thompson-Hayward Chemical Co.
P. O. Box 126, Grayston St. Sta.
222 Seguin Street
San Antonio 8

WISCONSIN
R. L. Ferguson
229 East Wisconsin Avenue
Milwaukee

CANADA
The Celedonia Co. Ltd.
751 Victoria Square
Montreal, Que.
The Caledonia Co. Ltd.
1195 Bloor Street West
Toronto, Ont. 4
The Caledonia Co. Ltd.
4456 Dunbar Street
Vancouver 8

Fred'k A. Stresen-Reuter, Inc.

CALIFORNIA
E. S. Browning Co.
1515 Third Street
San Francisco 7
E. S. Browning Co.
2321 Yates Avenue
Los Angeles 22

KENTUCKY
Wm. B. Tabler Company
P. O. Box 1254
Louisville 1

MICHIGAN
J. W. Stark Company
20050 Livernois
Detroit 21

NEW YORK
Superior Materials, Inc.
120 Liberty Street
New York 6

OHIO
Mr. J. John Richmond
561 Reading Street
Cincinnati 2

PENNSYLVANIA
A. C. Hurlbrink
3701 N. Broad Street
Philadelphia 40

Tamms Industries, Inc.

CALIFORNIA
S. L. Abbot Co.
Los Angeles
S. L. Abbot Co.
San Francisco

COLORADO
L. H. Herr
Denver

INDIANA
Ulrich Chemicals Inc.
Indianapolis

KENTUCKY
Walter Moser
Louisville

MASSACHUSETTS
A. H. Wandtke
Lexington

MICHIGAN
Geo. E. Moser & Son
Detroit

MINNESOTA
Ellsworth Bushnell
Minneapolis—St. Paul

MISSOURI
Ack Sales Co.
Kansas City

MISSOURI (Cont'd)
Service Brokerage
St. Louis

NEW YORK
Commercial Chemicals
Buffalo
D. B. Becker Co.
New York

OHIO
Rice & Co.
Cleveland
Walter Moser
Cincinnati

OREGON
Van Waters & Rogers, Inc.
Portland

PENNSYLVANIA
Jos. A. Burns & Son
Pittsburgh
Dowdy Bros.
Philadelphia

WASHINGTON
Van Waters & Rogers Inc.
Seattle

WISCONSIN
Standard Brokerage Co.
Milwaukee

CANADA
Drew Brown Ltd.
5410 Ferrier St.
Montreal, Quebec
Drew Brown Ltd.
50 Titan Road
Toronto, Ontario
Van Waters & Rogers Inc.
2625 Skeena St.
Vancouver, B. C.

Tennessee Products & Chemical Corp.

CALIFORNIA
Braun Chemical Company
1363 S. Bonnie Beach Place
Los Angeles 54
Braun-Knecht-Heimann Co.
1400 16th Street
San Francisco 19

OREGON
Van Waters & Rogers, Inc.
3950 N. W. Yeon
Portland 10

TEXAS
Van Waters & Rogers, Inc.
P. O. Box 13192
Dallas 20

WASHINGTON
Van Waters & Rogers, Inc.
4000 First Avenue South
Seattle 4

Troy Chemical Company

CALIFORNIA
Martin, Hoyt & Milne
906 E. Third Street
Los Angeles
Martin, Hoyt & Milne
Merchants Exchange Bldg.
San Francisco

FLORIDA
A. J. Passonno
107 22nd Street
Belleaire Beach
Indian Rocks

ILLINOIS
The G. R. O'Shea Company
858 Diversey Parkway
Chicago 14

Massachusetts
Hebert Lewis Company
30 Huntington Ave.
Boston

MICHIGAN
Gerald Fahey
2591 W. Grand Boulevard
Detroit

MINNESOTA
M. H. Baker Company
109 Portland Avenue S
Minneapolis

MISSOURI
Clifford Iorns Company
216 S. 7th Street
St. Louis

NEW JERSEY
J. Stern & Company
19 Deer Head Drive
Bound Brook

NEW YORK
C. Withington Company
47-40 Fifth Street
Long Island City

OHIO
Palmer Supplies Company
1401 Times Star Building
Cincinnati
Rice & Company
325 Bulkley Building
Cleveland

OREGON
A. J. Passonno
107 22nd Street
Belleaire Beach
Indian Rocks

PENNSYLVANIA
Dowdy Brothers
Wilford Building
33rd & Arch Streets
Philadelphia

The O'Hommel Company
209 Fourth Avenue
Pittsburgh

TEXAS
Van Waters & Rogers, Inc.
2316 Portsmouth
Houston

WASHINGTON
Great Western Chemical Co.
6921 E. Marginal Way
Seattle

Troy Division, Skinner Engine Co.

CALIFORNIA
L. H. Butcher Company
3628 E. Olympic Blvd.
Los Angeles

L. H. Butcher Company
15th & Vermont Streets
San Francisco 1

COLORADO
L. H. Herr Company
Interstate Trust Building
Denver 2

FLORIDA
Palmer Supplies of Florida
4471 N. W. 36th St.
Miami Springs

Palmer Supplies of Florida
211 East Robinson Avenue
Orlando

ILLINOIS
Mr. C. M. Baldwin
Lemar Bldg.
47th St. & Willow Springs Rd.
La Grange

MASSACHUSETTS
R. T. Forbes Company
15 Lincoln Street
P. O. Box 130
Newton Highlands 61

MICHIGAN
J. W. Stark Company
Nelson Avenue at 12345
Schaefer Highway
Detroit 27

NEW YORK
Mr. John M. Jewell
General Industrial Sales
P. O. Box 153
Olean
Mr. H. W. Markwardt
41 Tulane Road
Kenmore

OHIO
Robert L. Ware & Associates
131 East 211th Street
Cleveland 23

OREGON
L. H. Butcher Company
2750 N. W. 31st Avenue
Portland

PENNSYLVANIA
A. R. Amos Co.
Mr. A. R. Amos, Jr.
713 Commercial Trust Bldg.
Philadelphia 2

UTAH
L. H. Butcher Company
407 West 17th South Street
Salt Lake City

U B S Chemical Corp.

CALIFORNIA
Everitt & Ray, Inc.
1556 Industrial St.
Los Angeles 21

OHIO
Donald J. Coffey
3020 Euclid Heights Blvd.
Cleveland Heights

CANADA
Fraser & Davis Industrial Supplies Ltd.
Room 230
1980 Sherbrooke Street, West
Montreal 25, Quebec

United Ultramarine & Chemical Co., Inc.

CALIFORNIA
R. E. Flatow & Co., Inc.
10 Madison St.
P. O. Box 1166
Oakland 4

COLORADO
L. H. Herr & Co.
Interstate Trust Bldg.
Denver 2

GEORGIA
Charles L. Burks Co.
P. O. Box 54
East Point

ILLINOIS
Fred A. Jensen & Assocs.
510 North Dearborn St.
Chicago 10

KENTUCKY
William B. Tabler Co.
P. O. Box 1254
Louisville 1

MARYLAND
Van Horn Metz & Co., Inc.
3512 Newland Rd.
Baltimore 18

MASSACHUSETTS
Barrett & Sheahan Co.
80 Federal St.
Boston 20

MICHIGAN
Baker & Collinson
12000 Mt. Elliott Ave.
Detroit 12

MINNESOTA
Horton Earl Co.
6127 Excelsior Blvd.
Minneapolis 1

MISSOURI
Morton Meyers Co.
220 E. Missouri Ave.
Kansas City 6
Harry A. Baumstark & Co.
6801 Arsenal St.
St. Louis

NEW YORK
James O. Meyers Sons
290 Larkin
Buffalo

NORTH CAROLINA
Charles L. Burks Co.
P. O. Box 1032
Black Mountain
Charles L. Burks Co.
P. O. Box 1666
High Point

OHIO
Ducros & Co., Inc.
3592 Lee Road
P. O. Box 3945
Shaker Heights 20
William B. Tabler & Co.
P. O. Box 1254
Louisville

PENNSYLVANIA
Van Horn, Metz & Co., Inc.
241 East Elm St.
Conshohocken

TEXAS
JaRo-Chem
P. O. Box 10544
Dallas 7
JaRo-Chem
2323 Buffalo Drive
Houston 19

Velsicol Chemical Corp.

CALIFORNIA
E. B. Taylor Company
442 Colyton Street
Los Angeles

E. M. Walls Company
353 Sacramento Street
San Francisco

MISSOURI
Independent Oil Company
3930 Chouteau Avenue
St. Louis

OREGON
Great Western Chemical Co.
3720 N. W. Yeon Avenue
Portland

WASHINGTON
D. B. Smith Company
1016 First Avenue, South
Seattle

CANADA
Natural Products Corporation
60 Clarkson Street
Toronto

Vulcan Containers, Inc.

KENTUCKY
Bauer-Brown Solvent Co.
1316 W. Kentucky Street
Louisville 10

MASSACHUSETTS
Leonard Paynor
18 Wentworth Road
Canton

MICHIGAN
Krekel-Goetz Sales & Supply Co.
302 Houseman Building
Grand Rapids 2
Gerald J. Fahey
16772 Plainview Rd.
Detroit 19

OHIO
Palmer Supplies Co.
2281 Scranton Road
Cleveland 13
Palmer Supplies Co.
1400 Times Star Bldg.
Cincinnati 2

MINNESOTA
Industrial Steel Container Co.
2314 Wycliff Street
St. Paul 14

MISSOURI
Morton-Myers Company
220 E. Missouri Avenue
Kansas City 6
Vulcan Containers Inc.
c/o John J. Sheehan
705 Olive Street
St. Louis 1

NEW JERSEY
Dan Donoher
P. O. Box 19, Brookdale Sta.
Bloomfield

Warwick Division, Western Petrochemical Corp.

ALASKA
Don Chemical Co.
P. O. Box 1246
Anchorage

CALIFORNIA
E. S. Browning Company
2321 Yates Avenue
Los Angeles 22

GEORGIA
L. C. Morris Company
1186 Dalon Drive, N. E.
Atlanta 6

ILLINOIS
Central Solvents & Chemicals Co.
2540 West Flournoy Street
Chicago 12

INDIANA
Hoosier Solvents & Chemicals Corp.
Nelson Road East—P. O. Box 147
Fort Wayne
Hoosier Solvents & Chemicals Corp.
1650 Luett Avenue—P. O. Box 5586
Indianapolis 22

IOWA
Thompson-Hayward Chemical Co.
Southwest First & Granger Sts.
Des Moines 15
Wolverine Solvents & Chemicals
2940 Stafford Avenue, S. W.
Grand Rapids 9

KENTUCKY
Dixie Solvents & Chemicals Co.
Dixie Highway at Appleton Lane
Louisville 1

LOUISIANA
Southern Solvents & Chemicals Corp.
Box 4067, Carrollton Station
New Orleans 18

MASSACHUSETTS
N. S. Wilson & Sons
150 Causeway Street
Boston 14

MICHIGAN
Western Solvents & Chemicals Co.
6472 Selkirk Avenue
Detroit 11

MISSOURI
Missouri Solvents & Chemicals Co.
2522 Nicholson
Kansas City 20
Missouri Solvents & Chemicals Co.
419 De Soto Avenue
St. Louis 7

NEW YORK
Buffalo Solvents & Chemicals Corp.
P. O. Box 73, Station B
Buffalo 7, New York
Shamrock Chemicals Corp.
420 Lexington Avenue
New York 17

OHIO
Amsco Solvents & Chemicals Co.
4619 Reading Road
Cincinnati 29
Toledo Solvents & Chemicals Co.
4051 South Avenue
Toledo 14

OREGON
Van Waters & Rogers, Inc.
3950 Northwest Yeon
Portland 10

PENNSYLVANIA
Shamrock Chemicals Corp.
401 North Broad Street
Philadelphia 8
Campbell Chemical Co.
P. O. Box 486
Carnegie

TEXAS
Texas Solvents & Chemicals Co.
2500 Vinson Street
Dallas 12
Texas Solvents & Chemicals Co.
8501 Market Street
Houston 29

WASHINGTON
Van Waters & Rogers, Inc.
4000 First Avenue, South
Seattle 4
Van Waters & Rogers, Inc.
809 North Washington Street
Spokane

WISCONSIN
Wisconsin Solvents & Chemicals Corp.
1719 South 83rd Street
Milwaukee 14

T. F. Washburn Company

CALIFORNIA
The B. E. Dougherty Co.
1807 E. Olympic Blvd.
Los Angeles
B. E. Dougherty Co.
605 3rd Ave.
San Francisco

COLORADO
Thomas Wade
4845 Eggers Drive
Fremont, Calif.

FLORIDA
Palmer Supplies Co. of Fla.
211 E. Robinson Ave.
P. O. Box 784
Orlando

GEORGIA
Ralph Fitzsimons
P. O. Box 391
Sandy Springs

ILLINOIS
Don Fitzgerald Co.
5875 N. Lincoln Ave.
Chicago

INDIANA
The August Hoffman Co.
P. O. Box 41115
Indianapolis

KANSAS
Vulcan Sales Company
5920 Nall Avenue
Mission

MARYLAND
VanHorn Metz & Co.
William H. Wildon
3512 Newland Rd.
Baltimore

MASSACHUSETTS
Raw Materials Co., Inc.
140 Federal Street
Boston 10

MINNESOTA
Claude J. Smith
2801 Brookwood Terrace
Minneapolis

MISSOURI
Service Brokerage Co.
7205 Oakland Avenue
St. Louis

NEW YORK
Raw Materials Co., Inc.
220 East 42nd Street
New York 17

OHIO
Robert E. Bennett
3830 Walter Road
N. Olmstead

PENNSYLVANIA
Van Horn, Metz & Co., Inc.
241 East Elm Street
Conshohocken
J. R. Eckley
Coxcomb Hill Road
RD 2
New Kinsington

TEXAS
James D. Jensen
2523 Costa Mesa
Dallas

WASHINGTON
Durkin Chemicals Co., Inc.
2605 Second Avenue
Seattle

Whittaker, Clark & Daniels, Inc.

FLORIDA
Palmer Supplies Co.
211 East Robinson Ave.
Orlando

ILLINOIS
Harry Holland & Son, Inc.
9 South Clinton St.
Chicago 6

LOUISIANA
E. W. Ortenbach
411 Balter Bldg.
New Orleans 2

OHIO
Palmer Supplies Co.
Time Star Building
800 Broadway
Cincinnati 2

OHIO (Cont'd)
Palmer Supplies Co.
2281 Scranton Rd.
Cleveland 13
Leverett A. Anderson Co.
P. O. Box 5250
Akron 13

PENNSYLVANIA
R. Peltz Company
218 Wilford Building
33rd & Arch Sts.
Philadelphia 4

TENNESSEE
L. E. Offutt Co.
P. O. Box 8063
431 N. Dunlap Str.
Memphis 4

CANADA
Dalex Company Ltd.
100 Floral Parkway
P. O. Box 92
Toronto 15, Ont.

Woburn Chemical Corp.

CALIFORNIA
Martin, Hoyt & Milne
906 East 3rd Street
Los Angeles

Martin, Hoyt & Milne
Merchants Exchange Bldg.
San Francisco 4

ILLINOIS
Fred A. Jensen
510 North Dearborn St.
Chicago 10

MASSACHUSETTS
Woburn Degreasing Co.
Woburn
R. B. Huber
216 Tremont St.
Boston

MICHIGAN
O'Connor Chemicals, Inc.
10586 Knodell Street
Detroit 12

MINNESOTA
Worum Chemical Co.
2130 Kasota Avenue
St. Paul 14

MISSOURI
Nolte Brokerage Co.
721 Clark Avenue
St. Louis
Ack Sales Co.
901 E. 13th Ave.
N. Kansas City 16

NEW JERSEY
Mrs. Sidney Craven
552 Main St.
Chatham

NEW YORK
T. F. Gowdy Co.
26 Broadway
New York 4

OHIO
F. F. Myers Company
Akron Savings & Loan Bldg.
Akron 8

C. M. Durbin Company
Tri-State Building
432 Walnut Street
Cincinnati 2

J. H. Hinz Company
308 Rockerfeller Bldg.
Cleveland 13

OREGON
Martin, Hoyt & Milne
1501 N. W. Kearney
Portland

PENNSYLVANIA
J. C. Ackerman Company
Penn-Lincoln Hotel
Pittsburgh 21

Lincoln Industrial Chemical Co.
134 Orange Street
Reading

TEXAS
E. B. McCullough Company
1503 Hayden Road
Green's Bayou
Houston

WASHINGTON
Martin, Hoyt & Milne
1016 First Avenue South
Seattle 4

TRADE ASSOCIATIONS and SOCIETIES

NATIONAL PAINT, VARNISH and LACQUER ASSOCIATION
1500 Rhode Island Ave., N. W.
Washington 5, D. C.

ASSOCIATIONS

Air Pollution Control Assoc.
4400 Fifth Avenue
Pittsburgh 13, Pennsylvania

Amer. Assoc. For The Advancement of Science
1025 Connecticut Avenue, N. W.
Washington 6, D. C.

Amer. Bleached Shellac Mfrs. Assoc.
65 Pine Street
New York 5, New York

Amer. Council of Independent Labs.
4302 East-West Highway, N. W.
Washington 14, D. C.

Amer. Institute of Decorators
673 Fifth Avenue
New York 22, New York

Amer. Material Handling Society
638 Phillips Avenue
Toledo 12, Ohio

American Petroleum Institute
50 West 50th Street
New York 20, New York

American Society For Metals
7301 Euclid Avenue
Cleveland 3, Ohio

American Soy Bean Association
Hudson, Iowa

Amer. Wax Importers & Refiners Assoc.
c/o Distributing & Trading Company
444 Madison Avenue
New York 22, New York

Amer. Wood Preservers Assoc.
839 17th Street, N. W.
Washington 6, D. C.

★AMERICAN ZINC INSTITUTE
60 East 42nd Street
New York 17, New York

Asphalt Institute
Asphalt Building
University of Maryland
College Park, Maryland

Automotive Undercoating Mfrs. Assoc.
411 Piquette Avenue
Detroit 2, Michigan

Can Manufacturers Institute
Shoreham Building, N. W.
Washington 5, D. C.

Chemical Specialties Mfrs. Assoc.
50 East 41st Street
New York 17, New York

Collapsible Tube Manufacturers Assoc.
19 West 44th Street
New York 36, New York

Color Association of the United States
200 Madison Avenue
New York 16, New York

Copper & Brass Research Association
420 Lexington Avenue
New York 17, New York

Forest Products Research Society
P. O. Box 2010
University Station
Madison, Wisconsin

Glycerine Producers Association
295 Madison Avenue
New York 17, New York

Gummed Industries Association
11 West 42nd Street
New York 36, New York

Hardwood Plywood Institute
600 South Michigan Avenue
Chicago 5, Illinois

Institute of Appliance Manufacturers
Shoreham Hotel, N. W.
Washington 8, D. C.

Lead Industries Association
420 Lexington Avenue
New York 17, New York

Manufacturing Chemists Assoc. of the U. S.
1625 Eye Street, N. W.
Washington 6, D. C.

Material Handling Institute
1 Gateway Center
Pittsburgh 22, Pennsylvania

Nat'l. Assoc. of Architectural Metal Mfrs.
228 North LaSalle Street
Chicago 1, Illinois

Nat'l. Assoc. of Furniture Mfrs.
666 Lake Shore Drive
Chicago 11, Illinois

Nat'l Assoc. of Home Builders
1625 L Street, N.W.
Washington 6, D. C.

Nat'l Assoc. of Metal Finishers
35 East Wacker Drive
Chicago 1, Illinois

Nat'l Assoc. of Printing Ink Makers
1440 Broadway
New York 18, New York

Nat'l. Assoc. of Corrosion Engineers
919 Milan Bldg.
Houston 2, Texas

Nat'l. Barrel & Drum Assoc.
1145 19th Street, N.W.
Washington 6, D. C.

Nat'l. Clean-Up Paint-Up Fix-Up Bureau
1500 Rhode Island Avenue, N. W.
Washington 5, D. C.

Nat'l Woodwork Mfrs. Assoc.
332 South Michigan Avenue
Chicago 4, Illinois

National Tung Oil Marketing Cooperative, Inc.
Popalarville, Miss.

Natural Rubber Bureau
1631 K Street, N. W.
Washington 6, D. C.

Northern Pine Mfrs. Assoc.
4329 Oakland Avenue
Minneapolis 7, Minnesota

Optical Manufacturers Assoc.
1475 Broadway
New York 36, New York

Optical Society of America
Room 8-203
Mass. Institute of Technology
Cambridge 39, Massachusetts

Packaging Institute
342 Madison Avenue
New York 17, New York

Packaging Machinery Mfg. Institute
342 Madison Avenue
New York 17, New York

Painting & Decorating Contractors of Amer.
540 North Michigan Avenue
Chicago 11, Illinois

Red Cedar Shingle Bureau
White Building
Seattle 1, Washington

Retail Paint & Wallpaper Dist. of Amer.
34 North Brentwood Boulevard
St. Louis 5, Missouri

Rubber Manufacturers Association
444 Madison Avenue
New York 22, New York

Southern Pine Association
National Bank of Commerce Building
New Orleans 4, Louisiana

FEDERATION of SOCIETIES for PAINT TECHNOLOGY
121 South Broad St.
Philadelphia 7, Pa.

Steel Shipping Container Institute
600 Fifth Avenue
New York 20, New York

Steel Structures Painting Council
4400 Fifth Avenue
Pittsburgh 13, Pa.

Steel Tank Institute
120 South LaSalle Street
Chicago 3, Illinois

Steel Window Institute
806 Rowland Road
Cheltenham, Pennsylvania

Synthetic Organic Chem. Mfrs. Assoc. of the U. S.
41 East 42nd Street
New York 17, New York

Tall Oil Association
122 East 42nd Street
New York 17, New York

U. S. Shellac Importers Association
155 John Street
New York 7, New York

Venetian Blind Assoc. of Amer.
435 North Michigan Avenue
Chicago 11, Illinois

Wet Ground Mica Association
420 Lexington Avenue
New York 17, New York

PROFESSIONAL SOCIETIES

American Chemical Society
1155 16th Street, N. W.
Washington 6, D. C.

Amer. Institute of Chem. Eng.
25 West 45th Street
New York 36, New York

Amer. Institute of Consulting Eng.
33 West 39th Street
New York 18, New York

American Oil Chemists' Society
35E Wacker Drive
Chicago 1, Ill.

Amer. Society of Body Engineers
100 Farnsworth Avenue
Detroit 2, Michigan

Amer. Society of Testing Materials
1916 Race Street
Philadelphia 3, Pennsylvania

Assoc. of Consulting Chemists and Chemical Engineers
50 East 41st Street
New York 17, New York

Society of Industrial Packaging & Material Handling Engineers
111 West Jackson Boulevard
Chicago 4, Illinois

Society of Automotive Engineers
29 West 39th Street
New York 18, New York

Society of Fire Protection Engineers
60 Batterymarch Street
Boston 10, Massachusetts

Society of Naval Architects and Marine Engineers
74 Trinity Place
New York 6, New York

Society of Plastics Engineers
34 East Putnam Avenue
Greenwich, Connecticut

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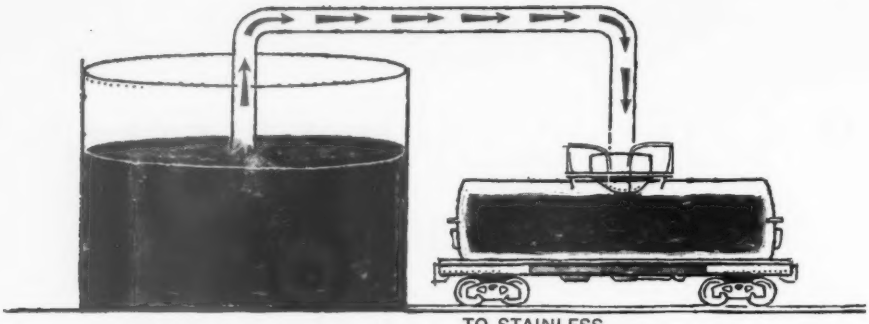
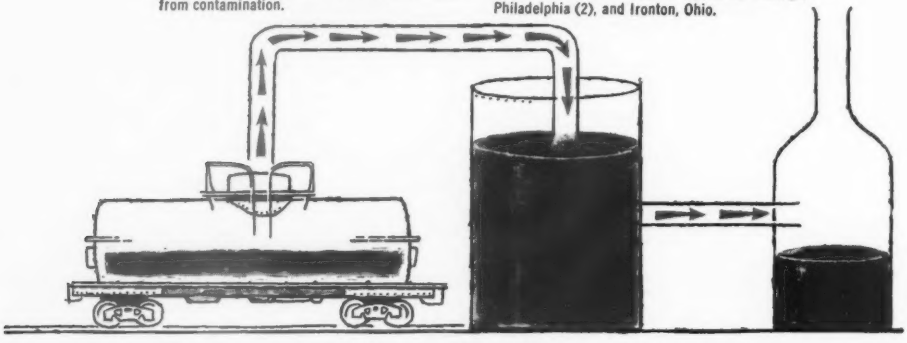


FROM OUR STILL RECEIVER . . .
Plastics and Coal Chemicals Division has perfected methods of storage and transfer for molten phthalic anhydride which assure color stability and freedom from contamination.

TO STAINLESS TANK CAR OR TRUCK
For short hauls of 100 miles or less, tank trucks are recommended. Molten phthalic will be shipped from the nearest of our 4 plants in Chicago, Philadelphia (2), and Ironton, Ohio.



FROM STAINLESS TANK CAR OR TRUCK
Tank cars may be unloaded from the top, by inert gas pressure, or from the bottom, by gravity flow.

TO YOUR STORAGE TANK
An 18-8 stainless steel insures against discoloration. Tank should be well insulated, with internal heating coils and temperature controls. Molten phthalic is blanketed with inert gas.

TO END PROCESS
Molten phthalic is readily pumped to process by centrifugal pump. Its high temperature speeds processing, and increases capacity of existing equipment.

The Care and Handling of Phthalic Anhydride

Large users of Phthalic Anhydride can realize substantial savings by converting to molten phthalic. For smaller users, Plastics and Coal Chemicals Division ships the flake form in unit loads designed for peak efficiency at the receiving end.

As your business grows, so do your raw material tonnages. As this happens, you may eventually have to ask yourself, "Will it pay me to switch to molten phthalic?"

We have helped many customers answer this question. It's a matter of carefully estimating the cost savings you may expect . . . and comparing these savings with your anticipated investment in handling equipment for molten phthalic.

Shipped in molten form, Phthalic Anhydride will cost you less per pound than flake. The saving is ½¢ per pound.

You must also consider the labor savings—no bags to unload, transport, empty or dispose of. And, because you introduce the phthalic at 150°C, you can save on process heat requirements. Other benefits that help swing the balance are less easy to measure in dollars and cents:

- Increased productive capacity resulting from shorter reaction cycles with hot molten phthalic
- Release of precious indoor storage space
- Elimination of waste and dust
- Reduction of contamination possibilities (molten phthalic is handled in a closed system)

Perhaps it's time you discussed conversion—or some other modification in your handling of Phthalic Anhydride, be it molten or flake. Call our representative or write us direct and we'll get in touch with you posthaste.

And in the Flake Form . . .

Plastics and Coal Chemicals Division ships a variety of unity load arrangements to speed unloading at the receiving end. Before shipment, bags are "kneaded" between giant rollers to give them the firmness and flatness that make ideal unit loads.

Allied Chemical

PLASTICS AND COAL CHEMICALS DIVISION
40 Rector Street, New York 6, N. Y.

For more information circle No. 103—last page

TRADE NAME DIRECTORY

A

AA—Refined castor Oil. **Baker Castor Oil Co.**
Abbé—Mills & mixing machinery. **Abbé Engineering Company.**
Abestol—Extender. **Carbola Chemical Co., Inc.**
Abitol—Technical hydroabietyl alcohol. **Hercules Powder Company**
AC—Polyethylene. **Semet-Solvay Petrochemical Division, Allied Chemical Corp.**
Accol Resin—Resin emulsion. **Amalgamated Chemical Corp.**
Accosperse—Acqueous pigment dispersions, **American Cyanamid Co.**
Accu-Por—Round nozzle top paint cans. **American Can Co.**
Acetate P.A.—Deodorant. **Givaudan-Delawanna, Inc.**
Acetex—Emulsion copolymer. **Naugatuck Chemical Div., U. S. Rubber Co.**
Acetosol—Solvent soluble dyes. **Sandoz, Inc.**
Acintene—Pinenes and turpentine. **Arizona Chemical Company.**
Acintol—Tall oil. **Arizona Chemical Company**
Acl—Chlorinated cyanuric acid. **Monsanto Chemical Co.**
Acme—Shellac varnish. **Acme Shellac Products Co.**
Acofor—Distilled tall oil fatty acids. **Newport Industries**
Acolin—Distilled tall oil. **Newport Industries**
Aconew—Refined tall oil fatty acids. **Newport Industries**
Aconon—Refined tall oil. **Newport Industries**
Acosix—Distilled tall oil. **Newport Industries**
Aquagel—Bodying Agent. **Troy Chemical Co.**
Acrawax C—Synthetic wax. **Glyco Products Co., Inc.**
Acrillex—Emulsion vehicle. **California Ink Co., Inc.**
Acryloid—Acrylic ester resins. **Rohm & Haas Company**
Acrylon—Acrylic rubber. **The Borden Company**
Acrylonitrile — Monomers. **Union Carbide Chemicals Co.**
Acrysol—Acrylic resin. **Rohm & Haas Company**
Activ-8—Drier-stabilizer. **R. T. Vanderbilt Co.**
Acyralasein—Casein solution. **W. H. Fales Co.**
Adher-O-Flex—Esterfied Shellac. **Acme Shellac Products Co.**
Adipol—Plasticizer. **Ohio-Apex Division**
Adiprene—Liquid urethane rubber. **E. I. Du Pont de Nemours & Co.**
Adlube—Plastic mold lubricant. **Advance Solvents & Chemicals Div. of Carlisle Chemical Works, Inc.**
ADM Adols—Fatty Alcohols. **Archer Daniels Midland Company**
ADM Ester Gum—Complete line of Ester Gums. **Archer Daniels Midland Company**
ADM Natural Resins—Congo, Damar, East India, Kauri Gum, Manila Gum. **Archer Daniels Midland Company**
ADM Processed Congo—Fused & Esterified Congo Gum. **Archer Daniels Midland Company**
ADM Unadols—Fatty Alcohols. **Archer Daniels Midland Company**
Adol—Fatty Alcohols. **Archer Daniels Midland Company**
A D P—Carbon Black dispersions. **Acheson Dispersed Pigments Co.**
Advacide—Fungicidal compound. **Advance Solvents & Chemical Div. of Carlisle Chemical Works, Inc.**
Advagum—Synthetic rubber extender. **Advance Solvents & Chemical Div. of Carlisle Chemical Works, Inc.**
Advamin—Fungicidal compound. **Advance Solvents & Chemical Div. of Carlisle Chemical Works, Inc.**
Advamix—Wetting agent. **Advance Solvents & Chemical Div. of Carlisle Chemical Works, Inc.**
Advan—Accelerators. **Advance Solvents & Chemical Div. of Carlisle Chemical Works, Inc.**
Advance—Naphthenate paint driers. **Advance Solvents & Chemical Div. of Carlisle Chemical Works, Inc.**
Advaresin—Drying oil extenders. **Advance Solvents & Chemical Div. of Carlisle Chemical Works, Inc.**
Advasol—Driers. **Advance Solvents & Chemical Div. of Carlisle Chemical Works, Inc.**
Advastab—Vinyl resin stabilizers. **Advance Solvents & Chemical Div. of Carlisle Chemical Works, Inc.**
Advawax—Petroleum waxes. **Advance Solvents & Chemical Div. of Carlisle Chemical Works, Inc.**
Advawet—Wetting agents. **Advance Solvents & Chemical Div. of Carlisle Chemical Works, Inc.**
Aero—Maleic and Phthalic Anhydrides; various grades of Aluminum. Zinc and Calcium Metallic Soaps. **American Cyanamid Company, Industrial Chem. Div.**
Aerosol—Surface Active Agents. **American Cyanamid Company, Industrial Chem. Div.**
Afco Feutron—Filter cartridges. **American Felt Co.**
Age-Best Dispersion—Anti-Oxidant. **Borden Co.**
Air-Matic—Small parts washer. **The Protectoseal Co.**
Aisle-Saver—Lift truck. **Barrett-Cravens Co.**
Alamac—Fatty amine esters. **General Mills, Inc.**
Alamask—Paint deodorant. **Rhodia, Inc.**
Alamine—Primary fatty amines. **General Mills, Inc.**
Albacar—Precipitated calcium carbonate. **C. K. Williams & Co.**
Albalith—Lithopone. **New Jersey Zinc Co.**
Albron—Aluminum Powders and Pastes. **Aluminum Company of America**
Alcoa—Aluminum Powders and Pastes. **Aluminum Company of America**
Alcogum—Deflocculating Agent. **Alco Oil and Chemical Corp.**
Alcolec—Lecithin. **American Lecithin Co., Inc.**
Alcroyd—Long Oil Alkyd. **Crosby Chemicals, Inc.**
Algel—Gelling agent. **Raybo Chemical Co.**
Alipal—Surface active agents. **General Aniline & Film Corp.**
Alpex—Thixotropic additive. **Reichhold Chemicals, Inc.**
Aliphat—Tall oil fatty acids. **General Mills, Inc.**
Alkaterges—Surface active agents. **Commercial Solvents Corporation**
Alk-O-Flex—Plasticizers, Resins. **Alkydol Labs, Div. of Reichhold Chemicals, Inc.**
Alk-O-Mer—Resins, Vinyl Emulsion. **Alkydol Labs., Div. of Reichhold Chemicals, Inc.**
Alkyum—Alkyd Resin. **Adco Chemical Co.**
All-Steel—Ball and pebble mills. **Paul O. Abbé, Inc.**
Alodine—Protective coating chemicals for aluminum and aluminum alloys, **Amchem Products, Inc.**
Alpex—Cyclized rubber. **Alkydol Labs., Div. of Reichhold Chemicals, Inc.**
Alrosols—Surface Active agent. **Geigy Industrial Chemicals**
Alsibronz—Water ground mica. **Franklin Mineral Products Company.**
Alumagel—Gelling Agent. **Witco Chemical Co., Inc.**
Amberlac—Modified alkyds. **Rohm & Haas Co.**
Amberol—Varnish and lacquer resins. **Rohm & Haas Company**
Ambrose—Filling and sealing machines and strainers. **C. M. Ambrose Co.**
Amine O—Surface active agent. **Geigy Industrial Chemicals**
Amoco—Products manufactured by **Amoco Chemicals Corp.**
Amsco-Solv—A group of intermediate aromatic petroleum solvents in varying boiling ranges. **American Mineral Spirits Company**
Amyl Acetate—Synthetic solvent. **Industrial Div., Pennsalt**
Analyte—Color comparator. **Crown Engineering & Sales Company**
Anathix—Thixotropic alkyd. **General Electric Co. (West Coast)**
Angular—Mixer. **Troy Engine & Machine Co.**
Ansol—Solvents. **U. S. Industrial Chemicals Co.**
Antarte—Emulsifiers. **General Aniline & Film Corp.**
Antaron—Surface active agents. **General Aniline & Film Corp.**
Antarox—Surface active agents. **General Aniline & Film Corp.**
Antifoam A—Silicone defoamer. **Dow Corning Corp.**
Antioxidant B—Anti-skinning agent and antioxidant. **National Aniline Division, Allied Chemical Corp.**
Antioxidant D—Anti-skinning agent and antioxidant. **National Aniline Division, Allied Chemical Corp.**
AntiSag—Anti-sagging, anti-settling, wetting and dispersing agent. **Raybo Chemical Company**
AntiSilk—Anti-silking, anti-floating agent. **Raybo Chemical Company**
Antiskin—Anti-skinning agent. **Raybo Chemical Company**
Antistat—Anti-static agent. **Raybo Chemical Company**
AP—Aromatic Plasticizer. **Pennsylvania Industrial Chemical Co.**
Apco—Aliphatic hydrocarbon thinner. **Anderson-Prichard Oil Corporation**
Apcothinner—Aliphatic petroleum thinner. **Anderson-Prichard Oil Corporation**
Aquablak—Carbon and bone blacks. **Columbian Carbon Co.**
Aqualastic—Casein solution. **W. H. Fales Co.**
Aquamac—Emulsions. **McWhorter Chemicals, Inc.**
Aquasperse 30—Casein vehicle for emulsion paints. **American Resinous Chemicals Corp.**
Araldite—Epoxy resins. **Ciba Company, Inc.**
Arcturus—Red pigments. **Sherwin-Williams Co.**
A-Resin—Heat convertible unsaturated aliphatic pure hydrogen polymer. **Enjay Company, Inc.**
Aritemp—Epoxy Casting Resins. **Aries Laboratories, Inc.**
Aricite—Grinding balls. **Porcelain Div., Ferro Corp.**
Arizole—Anethole & pine oil. **Arizona Chemical Co.**
Armac—Acetic acid salts of fatty amines. **Armour Industrial Chemical Co.**
Armeens—High molecular weight aliphatic amines, paint additive. **Armour Industrial Chemical Co.**
Armids—Aliphatic amides. **Armour Industrial Chemical Co.**
Arochem—Modified Phenolic Resins, modified maleic resins, specialty resins. **Archer Daniels Midland Company**
Aroclor—Chlorinated biphenyl resins. **Monsanto Chemical Company**
Arofene—Pure Phenolic Resins. **Archer Daniels Midland Company**
Aroflat—Alkyds & Specialties for Flat Finishes. **Archer Daniels Midland Company**
Aroflo—Channel black. **J. M. Huber Corp.**
Aroostocrat — Potato Starch. **Morningstar-Paisley, Inc.**
Aroplax—Alkyd and Allied Resins. **Archer Daniels Midland Company**
Aropol—Copolymer Modified Alkyds, Polyester Resins. **Archer Daniels Midland Company**
Arothex—Thixotropic alkyd. **Archer Daniels-Midland Co.**
Arquads—Quaternary ammonium salts. **Armour Industrial Chemical Co.**
Arrow Ink Black—Channel Black. **J. M. Huber Corp.**
ASA—Antiskinning agent and antioxidant. **National Aniline Division, Allied Chemical Corp.**
Asbestol—Calcium carbonate extender pigments. **Carbola Chemical Company**
ASP—Extender pigments, aluminum silicate. **Minerals & Chemical Corp. of America**

ASRA—Three-roller ointment mills. **Chemical and Pharmeceutical Industry Co., Inc.**
Assay—Grinding jar. **Paul O. Abbé, Inc.**
Atlac—Polyester Alkyd Resins. **Atlas Powder Company**
Atlas—Dry colors. **H. Kohnstamm & Co., Inc.**
Attaclay—Finely powdered fullers earth. **Minerals & Chemicals Corp. of America**
Attagel 20—Suspending and thickening agent. **Mineral & Chemicals Corp. of America**
Attasol—Colloidal fullers earth. **Minerals & Chemicals Corp. of America**
Attasorb—Fullers earth. **Minerals & Chemicals Corp. of America**
Aulabrite—Water dilutable color emulsions. **Aula Chemicals, Inc.**
Auto-Klean—All metal edge type filter. **The Cuno Engineering Corp.**
AYAA, AYAC, AYAF, AYAZ—Vinyl acetate resins. **Union Carbide Plastics Co.**
AZO—Zinc Oxide pigments; lead-free and leaded. **American Zinc Sales Company**

B

Bacilli—Grinding jar. **Paul O. Abbé, Inc.**
Bahama Blue — Phthalocyanine blue pulps. **Standard Ultramarine & Color Co.**
Bakelite—Vinyl, polyethylene, phenolic and epoxy resins, emulsions and solutions. **Union Carbide Plastics Co.**
Barber Gilsonite—Hydrocarbon resins. **American Gilsonite Co.**
Barden—Kaolin. **J. M. Huber Corp.**
Baryta White—99% BaSO4 white barytes. **DeLore Div., National Lead Co.**
BCU—Urea resins. **Union Carbide Plastics Co.,**
Beckacite—Modified Phenolic resins. **Reichhold Chemicals, Inc.**
Beckamine—Urea-formaldehyde resins. **Reichhold Chemicals, Inc.**
Beckopol—Modified phenolic resins. **Reichhold Chemicals, Inc.**
Beckolin—Synthetic drying oils. **Reichhold Chemicals, Inc.**
Beckosol—Pure and modified alkyd resins. **Reichhold Chemicals, Inc.**
Beetle—Urea-Formaldehyde Resins. **American Cyanamid Company**
Benthal—Polyhydric alcohol. **Monsanto Chemical Company**
Bentone—Gelling Agents. **National Lead Co.**
Benzoflex—Chemical Plasticizers. **Tennessee Products & Chemical Corporation**
Benzoflex—Fixing agents. **General Aniline & Film Corp.**
Benzo Sol—Light Naphtha. **Shell Oil Company**
Bianol—Cationic bacteriological agents. **General Aniline & Film Corp.**
Big-M-Gel—Long oil liquid gel. **Adco Chemical Co.**
Biopal—Iodophor concentrate. **General Aniline & Film Corp.**
BKR—Lump phenolic resin. **Union Carbide Plastics Co.**
BKS—Phenolic baking solutions. **Union Carbide Plastics Co.**
Black Pearls—Pelleted channel carbon blacks. **Godfrey L. Cabot, Inc.**
Black Shield—Pigment dispersions. **Carbon Dispersions, Inc.**
Blancol—Anionic dispersant. **Antara Chemicals**
Blancophor—Whitening agent. **General Aniline & Film Corp.**
Blankit—Sodium hydrosulphite. **General Aniline & Film Corp.**
Blazecrete—Refractory materials. **Johns-Manville**
Blendoyl—Plasticizer for nitrocellulose. **Baker Castor Oil Co.**
B. M. G.—Long oil liquid gel. **Adco Chemical Company**
Boroterm—Highly soluble borate composition for fire resistant water-base paints. **American Potash & Chemical Corp.**
Boxeal—Case sealing glue. **Morningstar-Paisley, Inc.**
BRC—Resinous hydrocarbon plasticizer. **Plastics and Coal Chem. Div., Allied Chem. Corp.**
BR Castor Oil—Bleached, refined raw castor oil. **Pacific Vegetable Oil Corp.**
Briggs—Filters. **Bowser, Inc.**
Brilliant Toning Red—Permanent red 2B. **Sherwin-Williams Co.**
Britone Red—Resinated lithol reds. **Sherwin-Williams Co.**
Bruji—Emulsifiers; polyoxyethylene lauryl ethers. **Atlas Powder Company**
Bronoco—Aliphatic and aromatic petroleum solvents. **The R. J. Brown Company**
BRS—Polyester resins. **Bakelite Company**
Buckeye Pro-Cote—Protein thickener-stabilizer. **The Buckeye Cotton Oil Company**
Buckeye Protein—Protein thickener-stabilizer. **The Buckeye Cotton Oil Company**
Bufen 30—Preservative. **Buckman Laboratories, Inc.**
Bufenoleate 30—Preservative. **Buckman Laboratories, Inc.**
Bulls Eye Brand—Shellac gums. **William Zineer & Co., Inc.**
Burnok—Thixotropic paint vehicles. **Fred'k. A. Stresen-Reuter, Inc.**
Burnok—Thixotropic vehicles. **T. F. Washburn Company**
Burtonite—Guar Seed Gum. **The Burtonite Co.**
Burundum—Grinding media. **The U. S. Stoneware Company**
Butaprene—Paint latex. **The Firestone Plastics Company**
Butarez—Petroleum hydrocarbon resin. **Phillips Petroleum Company**
Butrol—Preservative. **Buckman Laboratories, Inc.**
Butvar—Polyvinyl butyral resin. **Shawinigan Resins Corporation**
BV—Oil-modified Alkyd. **Basic Varnish & Research Corp.**
BVA—Oil-modified Alkyd. **Basic Varnish & Research Corp.**

C

Cabarose Red—B.O.N. maroon. **B. F. Goodrich Chemical Co.**
Cab-o-lite—Wollastonite. **Godfrey L. Cabot, Inc.**
Cab-o-sil—Colloidal Silicone dioxide. **Godfrey L. Cabot, Inc.**
Caddy Red Toner R-6222—Pyrazolone reds. **R. F. Goodrich Chemical Co.**
Cadmolith—Cadmium red and yellow lithipones. **The Glidden Company**
Ca Fe Mag—Sequestering agent. **Pfister Chemical Works**
Calcicoater Oil—Bodied Vegetable oil. **Pacific Vegetable Oil Corp.**
Calex—Emulsion Vehicle. **California Ink, Co., Inc.**
Calinate—Calcium soaps. **The Harshaw Chemical Company**
Calkyd—Alkyd Vehicle. **California Ink Co. Inc.**
Calo—Dipentene, pine oil, pitch. **John H. Calo Co.**
Cal-Vyn—Polyvinyl acetate emulsion. **Calvert-Mount Winans Co.**
Calwhite—Calcium carbonate pigment. **The Georgia Marble Co.**
Carbitol—Solvent. **Union Carbide Chemicals Co.**
Carbium—Precipitated calcium carbonate. **Diamond Alkali Co., Silicate-Detergent-Calcium Div.**
Carbo Blue—Iron blue dispersions. **Kentucky Color & Chemical Company**
Carbolac—Channel carbon blacks. **Godfrey L. Cabot, Inc.**
Carbopol—Water sensitive gum, paint thickener. **B. F. Goodrich Chemical Company**
Carbose—Sodium Carboxymethylcellulose. **Wyandotte Chemicals Corp.**
Cargillon—Polyester resins. **Cargill, Inc.**
Cargoils—Fish oil based oils for barn paints. **Cargill, Inc.**
Cascoloids—Latex Stabilizers. **The Borden Company**
Castorwax—Waxlite, hydrogenated castor oil. **Baker Castor Oil Co.**
Castung—Dehydrated castor oil. **Baker Castor Oil Co.**
Catalox—2-ethylhexoic drier. **Ferro Chemical Corp.**
C-C- White—Calcium Carbonate. **DeLore Div., National Lead Co.**
C-D-M—Centrifugally Cast Dual Metal Rolls. **J. H. Lehmann Co., Inc.**
Celanese CL—Polyvinyl acetate emulsions. **Celanese Corporation of America.**
Celanese Solvent—Solvent. **Celanese Corporation of America**
Celite—Extender pigment, diatomaceous silica. **Johns-Manville Products Corp.**
Cellolyn—Abitol-derived alkyds and modified pentaerythritol esters of rosin. **Hercules Powder Company**
Cellosize—Hydroxyethyl Cellulose. **Carbide and Carbon Chemicals Co.**
Cellosolve—Solvent. **Carbide and Carbon Chemicals Company**
Celluflex—Plasticizers. **Celanese Corp. of America**
Century Colors—Vat colors. **Kentucky Color & Chemical Co.**
Century Red, Orange, Blue—Indanthrone colors. **Kentucky Color & Chemical Company**
Ceroxin Spezial—Thickening agent. **Dehydag Deutsche Hydrierwerke GMBH**
Cerulean Blue—Cobalt pigment. **Harshaw Chemical Co.**
Charlotte—Colloid Mill. **Chemicolloid Laboratories Inc.**
Cheelox—Sequestering agents. **General Aniline & Film Corp.**
Chemac—Additives, chemicals, compounds. **McWhorter Chemicals, Inc.**
Chembine—Ester of polyalcohol. **Naftone, Inc.**
Chempol—Resins. **Freeman Chemical Corp.**
Chemstor—Glass lined storage tanks. **The Pfaudler Company**
Cherokee—Kaolin Clay. **R. T. Vanderbilt Co.**
Chlorothene—Solvent. **Dow Chemical Co.**
Chlorowax 40—Plasticizer; liquid chlorinated paraffin. **Diamond Alkali Company**
Chlorowax 70—Resinous chlorinated paraffin. **Diamond Alkali Company**
Cicoil—Oiticica oil. **Brazil Oiticica, Inc.**
Cicolate—Driers. **California Ink Co., Inc.**
Cicosol—Driers. **California Ink Co., Inc.**
Cidao—Oiticica and castor oils. **Brazilian Industrial Oils, Inc.**
Citation Red—Permanent red 2-B, BON type. **Kentucky Color & Chemical Company**
Citro Deodorant—Paint deodorant. **Florida Molasses Corporation**
Citroflex—Citric acid ester plasticizers. **Chas. Pfizer & Co., Inc.**
CKR—Heat and non-heat hardening phenolic resins. **Union Carbide Plastics Co.**
CKV—Phenolic dispersions. **Union Carbide Plastics Co.**
Claw—Mixing propeller. **Craddock Equipment Co., Inc.**
Clearate—Lecithin. **W. A. Cleary Corp.**
CMC—Sodium carboxymethylcellulose. **Hercules Powder Company**
Coacetateblak—Carbon black cellulose acetate chips. **Columbian Carbon Co.**
Coacrylateblak—High color carbon black. **Columbian Carbon Co.**
Cobalt 254—Loss of dry inhibitor. **Nuodex Products Company, Inc.**
Cobalt Blue PN922—Cobalt aluminate. **The Harshaw Chemical Co.**
Coblac—Carbon black nitrocellulose dispersions **Columbian Carbon Co.**
Codispersion—Carbon black dispersions in various vehicles. **Columbian Carbon Co.**
Coethloblak—Black in ethyl cellulose. **Columbian Carbon Co.**
Cofar—Acrylic-vinyl latex. **Farnow, Inc.**
C-Oil—Hydrocarbon drying oil. **Enjay Company, Inc.**
Cold-Pro—Bleached Shellac. **Acme Shellac Products Company**
Colitic F—Calcium carbonate. **DeLore Div., National Lead Co.**
Colloresine — Sodium Carboxymethylcellulose. **General Aniline & Film Corp.**
Coloidex—Surface treated carbon olacks. **Columbian Carbon Co.**
Color Pax—Tinting colors. **California Ink Co., Inc.**
Color trend—Universal dispersions. **California Ink, Co., Inc.**
Common Sense—Disc filter. **Filpaco Industries**
Conaform—Vacuum drier. **Patterson Foundry & Machine Co.**
Concord—Wet ground mica. **Concord Mica Corp.**
Concord Maroon—Deep BON Maroon. **Standard Ultramarine & Color Company**
Conoco—Petroleum solvent. **Continental Oil Co.**
Continental—Carbon Blacks. **Witco Chemical Company**
Continental—Kaolin Clay. **R. T. Vanderbilt Company**
Continex—Furnace carbon black. **Witco Chemical Company**
Coors—High density grinding media. **LZP Industrial Ceramics**
Coresin blak—Black paste. **Columbian Carbon Co.**
Corial—Finishing agents. **General Aniline & Film Corp.**
Cosden—Solids. **Cosden Petroleum Corp.**
Cosden Polyvis—Polybutene. **Cosden Petroleum Corp.**
Cosol—High-flash naphtha. **Neville Chemical Company**
Covarnish blak—Dry powders. **Columbian Carbon Co.**
Covertex—Vehicles for emulsion paints and latex. **McCloskey Varnish Company**
Covinylblak—Dry chips. **Columbian Carbon Co.**
Cowles—Mixers. **Morehouse-Cowles Inc.**
CP Toluidine Maroon MT-1—Toluidine maroons. **B. F. Goodrich Chemical Co.**
CP Toluidine Toner RT-1—Toluidine reds. **B. F. Goodrich Chemical Co.**
CRCO—New Way—Labeling and packaging machines. **Chisholm-Ryder Co. of Pennsylvania**
Crilicon—Acrylic Emulsion. **Jersey State Chemical Co.**
Crosby—Maleic modified ester resin. **Crosby Chemicals, Inc.**
Crypton ZS—Zinc sulfide. **New Jersey Zinc Co.**
Cryptone—Zinc sulfide. **New Jersey Zinc Co.**
Crystal O—Castor Oil. **Baker Castor Oil Co.**
CTLA—Heat-reactive, aromatic-type olefinic hydrocarbon polymer. **Enjay Company, Inc.**
Cumar—Paracoumarone-indene resins. **Plastics & Coal Chemical Div., Allied Chemical Corp.**
Cunilate—Fungicides. **Scientific Oil Compounding Company, Inc.**
Cunimene—Fungicides. **Scientific Oil Compounding Company, Inc.**
Cuprous Oxide—Anti-fouling copper pigment. **The Glidden Co.**
Cyan Blue—Phthalocyanine blue. **American Cyanamid Co., Pigment Div.**
Cyanegg—Sodium cyanide. **E. I. du Pont de Nemours & Company, Inc.**
Cyanogum—Gelling agent. **American Cyanamid Co., Commercial Development Div.**
Cyaqua—Alkyd emulsion. **American Cyanamid Co., Plastics and Resin Div.**
Cyclodex—An emulsifiable cobalt catalyst. **Nuodex Products Company, Inc.**
Cyclo Sol—Aromatic Solvents. **Shell Oil Company**
Cyclowhirl—Portable mixer. **The Kwerel Co.**
Cycolac—Styrene copolymer resin. **Marbon Chemical Division**
Cycopol—Copolymer Resins. **American Cyanamid Company**
Cykel—Dicyclopentadiene treated vegetable oil. **Spencer Kellogg & Sons, Inc.**

Cykelin—Dicyclopentadiene treated linseed oil. **Spencer Kellogg & Sons, Inc.**
Cykelsoy—Dicyclopentadiene treated soybean oil. **Spencer Kellogg & Sons, Inc.**
Cymel—Alkylated melamine-formaldehyde resins. **American Cyanamid Co.**
Cyazc—Hard resin. **American Cyanamid Co. Plastics and Resins Div.**
C-8—Epoxy resins. **Union Carbide Plastics Co.**
C-10—Emulsion additive. **Apex Chemical Co.**
C-12—Resin for emulsions. **Farnow, Inc.**

D

D.E.R.—Epoxy resins. **Dow Chemical Co.**
D-Gel—Viscosity controller. **Degen Oil & Chemical Co.**
Dag—Colloidal graphite dispersions. **Acheson Colloids Company**
Dapon—Diallyl phthalate prepolymer. **Ohio-Apex Division**
Darasol—Non-flammable vehicle for aerosol application. Chlorinated Products Div., **Diamond Alkali Co.**
Darex Copolymer—Styrene Butadiene Copolymer. **Dewey & Almy Chemical Co.**
Darex D10P—Chemical Plasticizers. **Dewey & Almy Chemical Company**
Darex Everflex—Polyvinyl Acetate emulsion. **Dewey & Almy Chemical Company**
Darsol—Metal cleaner. **Decar Chemical Products Company**
Darvan—Dispersing Agents. **R. T. Vanderbilt Company**
Davenite—Water ground mica. **Hayden Mica Company**
Daxad—Dispersing Agent. **Dewey & Almy Chemical Co.**
Day—Mixers and roll mills. **J. H. Day Co.**
DB—Urethane grade castor oil. **Baker Castor Oil Co.**
Drapex—Epoxy stearate plasticizer. **Argus Chemical Corp.**
Dearborn Red—Red pigments. **Sherwin-Williams Co.**
Decroline—Zinc sulfoxylate formaldehyde. **General Aniline & Film Corp.**
Defoamer ED—Anti-Foam Agent. **El Dorado Oil Works**
Defoma—Anti-foaming agent. **Scher Bros.**
Dehydol—Nonionic surface active agent. **Fallrk Products Company, Inc.**
Dehydrol—Dehydrated Castor Oil. **Sherwin-Williams Co.**
DEO Oil—Deodorized fish oil. **Pacific Vegetable Oil Corp.**
Deodorized Apco—Deodorized aliphatic hydrocarbon thinner. **Anderson-Prichard Oil Corp.**
Deoxidine—Metal cleaners and rust removers. **American Chemical Paint Company**
Dermitron—Thickness tester. **Unit Process Assemblies, Inc.**
Detrex 79—Cleaner & phosphate treatment for steel. **Detrex Corporation**
D.G.—Magnesium Silicate. **Tamms Industries, Inc.**
Diamond K—Oxidized oils. **Spencer Kellogg & Sons, Inc.**
Dianol—Insecticide additive. **Dianol Div., Mills-Pearson Corp.**
Diazopon—Dispersing agent. **General Aniline & Film Corp.**
Dicalite—Diatomaceous Silica extender pigment. **Great Lakes Carbon Corporation**
Dicom—Dipentene. **Newport Industries, Inc.**
Dinopol—Plasticizer. **Ohio-Apex Division**
Dipentek—Dipentaerythritol technical. **Heyden Chemical Corporation**
Dipentene No. 122—Solvent—51% dipentene with other terpene hydrocarbons. **Hercules Powder Company**
Diphenolic Acid—Intermediate. **S. C. Johnson & Son, Inc.**
DiscPerser—Mixer. **Herman Hockmeyer & Co.**
Dispersa Gen—Soy dispersing agent. **General Mills, Inc.**
Disperse—Aqueous phase dispersant. **Raybo Chemical Company**
Dispersators—Mixers. **Premier Mill Corp.**
Disperso—Wettable metallic stearates. **Witco Chemical Company**
Dispersol—Insecticide base. **Shell Oil Company**
Dixie Perfecto—Carbon Black. **United Carbon Company, Inc.**
Dixie Reds—Toluidine and Para Substitutes. **Standard Ultramarine & Color Company**
DMT—Dimethyl terephthalate. **Hercules Powder Company**
Doubl—Limed wood rosin. **Newport Industries, Inc., Div. of Heyden-Newport Chem. Corp.**
Doubletite—Round friction top paint cans. **American Can Co.**
Dow Corning—Silicones. **Dow Corning Chemical Co.**
Dowfax—Surface active agent. **Dow Chemical Co.**
Dow Latex—Emulsion of either vinyl chloride, vinylidene chloride copolymer, styrene-butadiene copolymer, or polyvinylidene chloride. **The Dow Chemical Company**
Dowicides—Industrial germicide & fungicides. **Dow Chemical Company**
DPA—Intermediate. **S. C. Johnson & Son, Inc.**
Drarex—Plasticizer. **Argus Chemical Corp.**
Dresinate—Surface active sodium and potassium salts of rosins and tall oil. **Hercules Powder Company**
Dri-Film—Silicone water-repellents. **General Electric Co.**
Drisoy—Treated soybean oil. **Spencer Kellogg & Sons, Inc.**
Dry tain—Dry inhibitor. **Raybo Chemical Co.**
Drarex—Plasticizer. **Argus Chemical Corp.**
Dresinate—Surface active sodium and potassium salts of rosins and tall oil. **Hercules Powder Company**
Dri-Film—Silicone water-repellents. **General Electric Co.**
Drisoy—Treated soybean oil. **Spencer Kellogg & Sons, Inc.**
Drytain—Dry inhibitor. **Raybo Chemical Co.**
Duol—Resinated Lithol Rubine pigment. **E. I. de Pont de Nemours & Company, Pigments Dept.**
Duomeens—N-Alkyl Trimethylene diamines. **Armour Industrial Chemical Co.**
Duplex Disperser—Mixer disperser. **Troy Engine & Machine Co.**
Duplicane #715—Sugar can wax. **Warwick Wax Company, Inc.**
Duradiant—Burners. **Selas Corp. of America**
Duramac—Oil modified alkyds. **McWhorter Chemicals, Inc.**
Dura-Mill—Jar mill. **Patterson Foundry & Machine Co.**
Duraplex—Phthalic alkyd resins. **Rohm & Haas Company**
Dura-Prime—Steel drum surface preparation. **Bennett Industries, Inc.**
Duratone Reds—Toluidine and Para Substitutes. **Standard Ultramarine & Color Company**
Durez—Phenol-formaldehyde resin. **Durez Plastics & Chemicals, Inc.**
Dur Oayn—Isophthalic alkyd. **Specialty Resin Co.**
Duroxon—Soft Waxes. **Dura Commodities Corporation**
Dustex Micro-Silica—Soft amorphous silica. **Tamms Industries, Inc.**
Dutch Boy—Pigments—antimony oxide, calcium carbonate, barytes, white lead, red lead, litharge linseed oils, chemical plasticizers. **National Lead Company**
Dutrex—Rubber plasticizers, softeners and extenders. **Shell Oil Co.**
Dryolene—Aliphatic petroleum thinner (VM&P.) **Anderson-Prichard Oil Corporation**
Dyal—Alkyd resin. **Sherwin-Williams Co.**
Dylan—Polyethylene. **Koppers Company, Inc.**
Dylex K-34—Styrene butadiene latex. **Koppers Company, Inc.**
Dymal—Maleic resin. **Sherwin-Williams Co.**
Dymerex—Dimerized wood rosin. **Hercules Powder Company**
Dypenite—Modified phenolic resin. **The Sherwin-Williams Co.**
Dyphene—Phenolic resin. **Sherwin-Williams Co.**
Dyphenite—Phenolic resins. **Sherwin-Williams Co.**
Dyphos—Stabilizers for vinyls. **National Lead Company**
Dypol—Polyester resins. **Sherwin-Williams Co.**
D81—Epoxy plasticizer. **Dehydag Deutsche Hydrierwerke GMBH**

E

Eagle-Picher—Lead and Zinc Pigments. **The Eagle Picher Company**
Easy Ride—Conveyors. **Filpaco Industries**
Edenol—Plasticizers. **Dehydag Deutsche Hydrierwerke GMBH**
EGD—Acrylic Monomer. **American Monomer Corporation**
EHEC—Ethylated hydroxethyl cellulose. **Hercules Powder Company**
EKS, EKR, ERL—Epoxy resins. **Union Carbide Plastics Co.**
Elastex 40-P—Butyl iso decyl phthalate plasticizer. **Barrett Division**
Eldo—Fatty acids. **El Dorado Div., Foremost Food and Chemical Co.**
El Dorado—Tinting colors. **California Ink Co., Inc.**
Electro-Vapor—Dowtherm Kettles. **Blaw-Knox Co.**
Elf—Channel carbon blacks. **Godfrey L. Cabot, Inc.**
Elftex—Oil furnace carbon blacks. **Godfrey L. Cabot, Inc.**
Elvacet—Polyvinyl acetate emulsion. **E. I. du Pont de Nemours & Company**
Elvadex—Vinyl acetate copolymer. **E. I. du Pont de Nemours & Company**
Elvanol—Polyvinyl alcohol resin. **E. I. du Pont de Nemours & Company**
Emco—Ball mills, pebble mills, unitized agitator drives. **Epworth Manufacturing Co.**
Emcol H-50A—Hydrocarbon Solvent Emulsifier. **The Emulsol Corporation**
Emcol—Emulsifiers. **Witco Chemical Co.**
Emerox—Dibasic acids. **Emery Industries, Inc.**
Emersol—Fatty acids made by selective solvent separation. **Emery Industries, Inc.**
Emery—Vegetable fatty acids. **Emery Industries, Inc.**
Emfac—Monobasic acids. **Emery Industries, Inc.**
Empol—Polymerized fatty acids. **Emery Industries, Inc.**
Emulphogene—Surface active agents. **General Aniline & Film Corp.**
Emulphor—Nonionic surfactant. **Antara Chemicals Div. of Gen'l Aniline & Film Corp.**
Epi-Rez—Pure epichlorohydrin bisphenol resins. **Jones-Dabney Company**
Epi-Tex—Oil modified epichlorohydrin bisphenol resins. **Jones-Dabney Company**
Epi-Var—Oil modified epichlorohydrin bisphenol resins. **Jones-Dabney Company**
Epocast—Epoxy resins. **Furane Plastic, Inc.**
Epolene—Polyethylene waxes. **Eastman Chemical Prod., Inc.**
Epon—Epoxy resins. **Shell Chemical Corp.**
Epotuf—Epoxy resins. **Reichhold Chemicals, Inc.**
Erco-Reco Brown—Concentrated brown iron oxides. **Reichard-Coulston, Inc.**
Espesol—Aromatic, aliphatic and intermediate solvents. **Eastern States Chemical Corp.**
Esskol—Refined linseed oil. **Spencer Kellogg & Sons, Inc.**
Esso—Aliphatic petroleum solvents. **Esso Standard Oil Company**
Ester Gum 8D and 8L—Glycerol esters of pale wood rosin. **Hercules Powder Company**
Estynox—Epoxidized fatty ester plasticizers. **Baker Castor Oil Co.**
Ethocel—Ethyl Cellulose resins. **The Dow Chemical Company**
Ethoduomeens — Amine-type surface active agents. **Armour Industrial Chemical Co.**
Ethofats—Surface active agents. **Armour Industrial Chemical Co.**
Ethomeens—Surface active agents. **Armour Industrial Chemical Co.**
Ethomids—Surface active agents. **Armour Industrial Chemical Co.**
Eukanol—Finishing agents. **General Aniline & Film Corp.**
Eulan—Finishing agents. **General Aniline & Film Corp.**
Eulava—Finishing agents. **General Aniline & Film Corp.**
Eulysine—Finishing agents. **General Aniline & Film Corp.**
Eunaphthol—Dispersing agent. **General Aniline & Film Corp.**
Euston White Lead—Basic carbonate of lead. **The Glidden Co.**
EVT. 50—Thyrene buladiene latex. **Cargill, Inc.**
EXBC—Polyvinyl Ethyl ether polymer. **Union Carbide Plastics Co.**
EXBM—Polyvinyl ethyl ether polymer. **Union Carbide Plastics Co.**
Excelsior—Carbon Black pigment. **Columbian Carbon Company**
Exkins—Volatile anti-oxidant. **Nuodex Products Company, Div. of Heyden-Newport Chem. Corp.**
Exon—Vinyl & Styrene Resins. **Firestone Plastics Company**
Extra Fine—Aluminum pastes and powders. **Silberline Mfg. Company, Inc.**

F

FA—Alkyds. **Farnow, Inc.**
FA—Furfuryl alcohol. **The Quaker Oats Co.**
Fade-Ometer—Sunfastness Testing Machine. **Atlas Electric Devices Company**
FAFL—Flat Alkyd Vehicle. **Farnow, Inc.**
Falk Soybean Oils—Soybean oils, (raw, bodied, blown, kettled and specialty). **Cargill, Inc.**
Falkidine—Hard drying fish oils. **Cargill, Inc.**
Falkolin—Linseed oils, (raw bodies, blown, kettled and specialty). **Cargill, Inc.**
Falkomast—Fish and soybean oils specially processed for caulking compounds. **Cargill, Inc.**
Falklore—Esterified tall oils. **Cargill, Inc.**
Falkosoy—Maleinized soybean oils. **Cargill, Inc.**
Falkote—Maleic ester gums. **Cargill, Inc.**
Falkovar—Fish oils (raw, bodied, blown kettled and specialty). **Cargill, Inc.**
Falkowood—Maleinized linseed oils and fish oils. **Cargill, Inc.**
Falkyd—Oil modified alkyd resins. **Cargill, Inc.**
Fanchon Yellow—Hansa Yellows. **B. F. Goodrich Chemical Co.**
Faqd—Medium Oil length alkyd. **Farnow, Inc.**
Farac—Tall oil fatty acid. **Farac Oil & Chem. Co.**
Fastolux—Phthalocyanine green or blue toner. **Ansbacher-Siegle Corp.**
Fast Yellow—Yellow pigment. **R-B-H Dispersions.**
Fatchemco-O—Emulsifier. **Universal Chemicals Corporation**
Fax—Alkyd flat vehicle. **Farnow, Inc.**
FCD—Alkyd, phenolic, natural resins. **France, Campbell & Drying, Inc.**
FEGO—Enamel vehicle. **Farnow, Inc.**
Feon—Epoxy ester. **Farnow, Inc.**
Fer 3—Alkyd for emulsion and latex paints. **Farnow, Inc.**
Feutron—Synthetic fiber felts. **American Felt Co.**
Filmex—Solvent. **U. S. Industrial Chemicals Co.**
Fine—Organic dry color. **Sandoz, Inc., Fine Color Div.**
Firecrete—Refractory materials. **Johns-Manville Corp.**
Flexac—Emulsion polymer. **The Colton Chemical Co.**
Flexbond—Polyvinyl acetate emulsion. **The Colton Chemical Company**
Flexol—Plasticizers. **Union Carbide Chemicals Co.**

Flexowax C—Synthetic wax; anti-mar agent for lacquers. **Glyco Products Company, Inc.**
Flexricin—Castor oil—derived plasticizers. **Baker Castor Oil Co.**
Flextal—High rosin, non-crystallizing distilled tall oil. **Farac Oil & Chem. Co.**
Flextrol—Plasticizers. **McWhorter Chemicals, Inc.**
Flexwall—Phthalic alkyd flat wall tall oil vehicle. **Farac Oil & Chem. Co.**
FloInducer—Levelling agent. **Raybo Chemical Company**
Flomax—Stabilizer. **National Lead Co.**
Florence—French Process Zinc Oxide. **New Jersey Zinc Company**
Flow-Master—Homogenizer. **Marco Company, Inc.**
Foam Barytes—Refined barytes. **DeLore Div., National Lead Co.**
Foamex—Liquid defoaming agent. **Glyco Products Company, Inc.**
Foamtrol—Antifoam Agent. **Arlen Chemical Corp.**
Fo-Glo—Rosin gloss oil. **Newport Industries Co., Div. of Heyden-Newport Chem. Corp.**
F-O-M—Float-O-Matic control of rolls. **J. M. Lehmann Company, Inc.**
Fomout—Foaming prevention material. **R. T. Vanderbilt Co.**
Fomrez—Polyester resins. **Witco Chemical Co.**
Formcels—Formaldehyde solutions. **Celanese Corporation of America**
Formvar—Polyvinyl formal resin. **Shawinigan Resins Corporation.**
Fosbond—Phosphate coating and rust-proofing compound. **Pennsalt Chemicals Corp.**
Fosfo—Limed wood rosin. **Newport Industries,**
Foster—Rotary Pumps. **Foster Pump Works, Inc.**
Fotocol—Proprietary Solvent. **Commercial Solvents Corporation**
FR-28—Sodium Borate, fire retardant. **Pacific Coast Borax Company**
Franklin—Pulverizers. **Franklin P. Miller & Son, Inc.**
Futura—Ball and pebble mill. **Patterson Foundry & Machine Co.**

G

Gafite—Polymethyl alphachloroacrylate. **General Aniline & Film Corp.**
Gamaco—Calcium carbonate pigment. **The George Marble Co.**
Gamakal—Calcium carbonate pigment. **The George Marble Co.**
Gelva—Polyvinyl acetate resins. **Shawinigan Resins Corporation**
Gelvatol—Polyvinyl acetate emulsions. **Shawinigan Resins Corporation**
Gelzit—Gelling agent. **Baker Castor Oil Co.**
Genamid—Co-reactants for epoxy resin. **General Mills, Chemical Div.**
Gen-Flo—Styrene butadiene emulsion. **The General Tire & Rubber Company**
Genesol #2, #6—Terpene solvent. **Newport Industries Co. Div. of Heyden-Newport Chem. Corp.**
Genetron—Aerosol propellant. **General Chemical Div., Allied Chemical & Dye Corp.**
Geon Latex—Polyvinyl chloride emulsions. **B. F. Goodrich Chemical Company**
Geon Resin—Polyvinyl chloride resins. **B. F. Goodrich Chemical Company**
Gerlinger—Trucks and carriers. **Gerlinger Carrier Co.**
GGP Aluminum Extra Brilliant—Flake Aluminum Power. **U. S. Bronze Powder Works, Inc.**
Glaurin—Grinding aid and dispersing agent. **Glyco Products Company, Inc.**
Globlak—Carbon black—nitrocellulose chip. **Columbian Carbon Co.**
Glomax—Calcined clays. **Georgia Kaolin Co.**
Glycosperse—Emulsifying agent. **Glyo Products Co.**
Glycerine—Solvents. **General Aniline & Film Corp.**
Glyptal—Alkyd resins. **Archer-Daniels-Midland Co.**
G.N.S. #5—Pine Oil. **Newport Industries**
Go Getter—Electric lift truck. **Revolvator Co.**
Gold Bond "R" Silica—Amorphous Silica. **Tamms Industries, Inc.**
Gold Drops—Gold dispersions for lacquers. **B. F. Goodrich Chemical Co.**
Good-Rite—Salts of polacrylic acid. **B. F. Goodrich Chemical Co.**
GPF—Containers. **Geuder-Paeschke & Frey Co.**
Granada—Phthalocyanine green. **Standard Ultramarine & Color Co.**
Grandodraw—Zinc-phosphate coating chemicals for cold-forming. **Amchem Products, Inc.**
Granodine—Zinc-phosphate coating chemicals for bonding paint to steel. **Amchem Products, Inc.**
Graphic Red—Lithol reds. **Sherwin-Williams Co.**
Graphtol—Organic pigments. **Sandoz, Inc.**
Green-Pond—Lightfast yellow pigment. **E. I. du Pont de Nemours & Co., Inc., Pigments Dept.**
Grellow—Special lead chromate for green. **Kentucky Color & Chemical Company.**
Grip-Tight—Labeling Paste. **Morningstar-Paisley Products, Inc.**
Groco—Fatty acids. **A. Gross & Company**
GRP—Shellacs. **Gillespie-Rodgers-Pyatt Co., Inc.**
Guide-O-Matic—Control system for lift trucks. **Barrett-Cravens Co.**
Gulf—Aliphatic petroleum solvents. **Gulf Oil Corporation**
Guyandot Red Toners—Toluidine Substitutes. **Standard Ultramarine & Color Company**

H

Half-second Butyrate—Cellulose acetate butyrate resin. **Eastman Chemical Products, Inc.**
Halowax—Chlorinated naphthalene waxes. **Union Carbide Plastics Co.**
Hamatrol—Controller hammer vehicles. **McWhorter Chemicals, Inc.**
Handy-Pak—Steel pails. **Bennett Industries, Inc.**
Harflex—Plasticizers. **Harchem Division, Wallace & Tiernan**
Harshaw-V—Vinyl Stabilizers. **The Harshaw Chemical Company**
HB-20, 40—Alkyl-aryl type plasticizers. **Monsanto Chemical Company**
Heliogen—Phthalocyanine blue and green pigments. **General Dyestuff Corp.**
Helia—Limed wood rosin. **Newport Industries**
Helix—Limed wood rosin. **Newport Industries**
Hercoflex—Chemical plasticizers. **Hercules Powder Company**
Hercolyn—Hydrogenated methyl ester of rosin. **Hercules Powder Company**
Hetron—Polyester resins. **Hooker Electrochemical Company**
Hexogen—Paint driers. **Advance Solvents & Chemical Div. of Carlisle Chemical Works, Inc.**
Hi-Brite—Fluorescent products. **Shannon Luminous Materials Co.**
Hi-fax—Polyethylene coating. **Hercules Powder Co.**
Hifos—Limed wood rosin. **Newport Industries**
HiSolv Solvents—Petroleum Aromatic solvents. **Pennsylvania Industrial Chemical Corp.**
Hi-V12—Fluorescent paints. **Lawter Chemicals, Inc.**
HiWhite—Airfloated Georgia kaolinite. **J. M. Huber Corp.**
Horse Head—Zinc pigments. **New Jersey Zinc Company**
HR Cobalt 254—A cobalt "feeder" drier. **Nuodex Products Company, Div. of Heyden-Newport Chem. Corp.**
HTS—Basic Carbonate White lead. **National Lead Company**
Hycar—Rubber & latex. **B. F. Goodrich Chemical Co.**
Hycryl—Polyacrylate. **UBS Chemical Corp.**
Hydrasperse—Aluminum silicate extender pigment. **J. M. Huber Corp.**
Hydratex—Aluminum silicate extender pigment. **J. M. Huber Corp.**
Hydrite—Hydrated aluminum silicates. **Georgia Kaolin Co.**
Hydrofol—Glycerides & Fatty acids. **Archer-Daniels-Midland Company**
Hydro-Lock—Conversion unit. **Biach Industries**
Hydro-Magna—A suspension of magnesium hydroxide. **Merck & Co., Inc.**
Hydros—Heat treated wood rosin. **Newport Industries Co.**
Hyfac—Hydrogenated fatty acid. **Emery Industries, Inc.**
Hyonic—Surface active agent. **Nopco Chemical Company**
Hypalon—Methacrylic ester polymers and chlorosulfonated polyethylene elastomer. **E. I. du Pont de Nemours & Company, Elastomers Div.**
Hyprin—Plasticizer, chemical intermediate. **Dow Chemical Co.**
Hydro-magma—Magnesium hydroxide suspen-
Hyros—Heat-treated wood rosin. **Newport Industries Co.**
Hy-R-Speed—Mills. **Hy-R-Speed Inc.**
Hy-Speed—Agitators & Mixers. **Alsop Engineering Corporation**
Hywax—Fatty alcohol. **Werner G. Smith**

I

I Style—Oblong paint can with screw neck or Neuman opening. **American Can Co.**
IAF Compound—Anti-floating agent. **Imperial Paper & Color Corp.**
Iceberg—Aluminum Silicate Pigments. **Burgess Pigment Company**
Icepon—Surface active agent. **General Aniline & Film Corp.**
Igepal—Emulsifiers. **Antara Chemicals**
Igepon—Wetting & dispersing agents. **Antara Chemicals, Div. of General Aniline & Film Corp.**
Imperial Colors—Pigments. **Imperial Paper & Color Corp.**
Imperse—Pigment dispersion. **Imperial Paper & Color Corp.**
Impervite—Centrifugal pumps. **Fails Industries, Inc.**
Indo Blue B-1—Indanthrene blues. **B. F. Goodrich Chemical Co.**
Indo Marron MV-6601—Thio Indigoid maroon. **B. F. Goodrich Chemical Co.**
Indopol—Liquid polybutenes. **Indoil Chemical Company**
Indulin 70-GR-S—Copreipitate of lignin and a butadiene-styrene copolymer. **West Virginia Pulp and Paper Company**
Indusoil—Distilled tall oil. **West Virginia Pulp & Paper Company**
International—Mixers. **International Engineering, Inc.**
Iosol—Spirit soluble dyes. **National Aniline Division, Allied Chem. Corp.**
Iridite—Chromate conversion coatings. **Allied Research Products, Inc.**
Iron Red—Calcined synthetic yellow oxide. **Reichard-Coulston, Inc.**
Iron Yellow—Precipitated pure yellow oxide. **Reichard-Coulston, Inc.**
Irox—Iron oxides. **Reichard-Coulston, Inc.**
Irrathene—Irradiated polyethylene. **General Electric Co.**
Isco Amorphous Silica—Extender pigment, Silica. **Innis, Speiden & Company, Inc.**
Isofoam—Polyisocyanate foaming resin. **Isocyanate Products, Inc.**
Isotrol—Alkyd oils. **McWhorter Chemicals, Inc.**
Isotrol C&-A—Copper & Quindinoleute. **Ferro Chemical Corp.**
Isotron—Propellants and refrigerants. **Pennsalt Chemical Corp.**
Ivo—Bone blacks. **Columbian Carbon Co.**

J

JacBoy—Drum liner. **Jones & Laughlin Steel Sales Corp.**
Jaliner—Polyethylene liner. **Jones & Laughlin Steel Sales Corp.**
Jaysol—Isopropyl alcohol. **Enjay Company, Inc.**
Jel-O-Mer—Thixotropic additive. **Alkydol Labs, Div. of Reichold Chemicals, Inc.**
Jet—Mixers. **Herman Machinery Co., Inc.**
Jet Mill—High speed dispersion mill for liquids. **Patterson Foundry & Machine Company**
Jet Milled—Finely divided pigments. **Mineral Pigment Corp.**
Jet-Pak—Self-powered sprayer. **Sprayon Products, Inc.**

K

Kadox—Finest particle size Zinc Oxides. **New Jersey Zinc Co.**
Kady Mills—Dispersion Milling Equipment. **Kinetic Dispersion Corporation**
Kalmac—Extender pigment. **Georgia Marble Co.**
Kaolinites — Hydrated aluminum silicates. **Georgia-Kaolin Co.**
Kapsol—Plasticizer. **Ohio-Apex Division**
Katanol—Mordants. **General Aniline & Film Corp.**
Katapone—Rust Inhibitor. **General Aniline & Film Corp.**
Kaymol—Surface active agent emulsifier, antifoaming agent. **Kraft Chemical Company**
KCC—Talc type extender. **Kraft Chemical Co.**
Kelcosol—Fibrous refined, high viscosity sodium alginate. **Kelco Co.**
Kelecin—Surface active agent. **Spencer Kellogg & Sons, Inc.**
Kel-F—Trifluorochloroethylene polymer. **The M. W. Kellogg Company**
Kellin—Refined linseed oil. **Spencer Kellogg & Sons, Inc.**
Kel-sol—Universal tinting vehicle. **Spencer Kellogg & Sons, Inc.**
Keltex—Granular high viscosity sodium alginate. **Kelco Co.**
Keltrol—Styrenated linseed and soybean oils, vinyltoluene copolymer. **Spencer Kellogg & Sons, Inc.**
Kel-Vi-Tol—Linseed varnish oil. **Spencer Kellogg & Sons, Inc.**
Kel-X-L—Treated linseed oil. **Spencer Kellogg & Sons, Inc.**
Kenflex A—Polymer of aromatic hydrocarbons. **Kenrich Corp.**
Kenite—Extender pigment: diatomaceous earth. **Innis, Speiden & Co., Inc.**
Kneadermaster—Dispersion type mixer. **Patterson Foundry & Machine Company**
Kodox—Colloidal zinc oxides. **New Jersey Zinc Co.**
Koflex—Plasticizers and defoamers. **Kolker Chemical Corp.**
Kollamine—Dye assistants. **General Aniline & Film Corp.**
Kopol—Congo copal resins. **Reichhold Chemicals, Inc.**
Koresin—Condensation product of p-tertiary butyl phenol with acetylene. **General Dyestuff Corp.**
Korp—Soda-treated wood rosin. **Newport Indries, Inc.**
Kosmolak—Carbon black. **United Carbon Co., Inc.**
Kosmos F-4, BB, 1—Carbon black. **United Carbon Co., Inc.**
KP—Plasticizer. **Ohio-Apex Div.**
KPO—Polymerized linseed oils. **Spencer Kellogg & Sons, Inc.**
Kralastic—Styrene-butadiene resins. **Naugatuck Chemical**
Kreelon—Emulsifying wetting and penetrating agent (Anionic). **Wyandotte Chemicals Corp.**

Kromall—Pigment dispersions. **Kromall Chemical & Dispersions Corp.**
Kroma Reds—Pure precipitated red iron oxides. **C. K. Williams & Co.**
Kronisol—Chemical plasticizers. **Ohio-Apex Div.**
Kronitex—Chemical plasticizers. **Ohio-Apex Div.**
Krumbhaar—Phenolic resins. **Lawter Chemicals, Inc.**
KTPL—Low molecular weight polystyrene resins. **Koppers Company, Inc.**
K.V.O.—Linseed varnish oils. **Spencer Kellogg & Sons, Inc.**

L

Lactol Sprits—An aliphatic naphtha in the toluo evaporation range. **American Mineral Spirits Company**
Laminac—Unsaturated polyester resins. **American Cyanamid Company Plastics & Resins Div.**
Landora—Soda-treated wood rosin. **Newport Industries, Div. of Heyden-Newport Chem. Corp.**
Latok—Resin solution **T. F. Washburn Co.**
"L" China Clay—China clay. **Tamms Industries, Inc.**
Lehigh—Leaded zinc oxide. **New Jersey Zinc Company**
Lemac—Polyvinyl acetate. **The Borden Co.**
Lemol—Polyvinyl alcohol. **The Bordon Co.**
Lewisol—Maleic alkyd-modified rosin esters. **Hercules Powder Company**
Lightnin—Mixers. **Mixing Equipment Co., Inc.**
Lignocol—Anti-skinning agent and anti-oxidant. **Heyden Chemical Corporation.**
Ligrene—Crude tall oil subsitute. **West Virginia Pulp & Paper Co.**
Ligro—Crude tall oil. **West Virginia Pulp & Paper Company**
Lime-KYD—Alkyd vehicle. **California Ink Co., Inc.**
Lindol—Low color tricresyl phosphate. **Celanese Corporation of America**
Linoresinate—Tall oil type driers. **The Harshaw Chemical Company**
Linstyrol—Styrenated linseed oil. **Spencer Kellogg & Sons, Inc.**
Liquiflow—Low pressure bulk CO2. **Liquid Carbonic Corp.**
Lithoform—Zinc phosphate coating chemicals for bonding paint to zinc. **Amchem Products, Inc.**
Lithol Rubine Toners—Lithol rubines. **B. F. Goodrich Chemical Co.**
Lo-Micron—Barytes. **Whittaker, Clark & Daniels, Inc.**
Lo-Odor—Octasol driers. **The Harshaw Chemical Company**
Lorite—Diatomaceous material. **DeLore Div., National Lead Company**
LP-2—Polysulfide hydrocarbon resins. **Thiokol Corporation**
LPR-1—Latex additive. **Naftone, Inc.**
LS Raw Sienna—Italian raw Sienna. **Reichard-Coulston, Inc.**
Lucite—Methyl methacrylate resin. **E. I. du Pont de Nemours & Company, Polychemicals Dept.**
Ludigal—Kier assistants. **General Aniline & Film Corp.**
Lumard—Grinding jars. **Paul O. Abbé, Inc.**
Lumarol—Mill jar. **Patterson Foundry & Machine Co.**
Lumigraphic colors—Special organic colors fluorescing in daylight or under ultraviolet light. **Imperial Paper and Color Corporation**
Luncor PVC—Polyvinyl chloride valves. **Lunkenheimer Company**
Lustrasol—Acrylic solutions. **Reichold Chemicals, Inc.**
Lustrelith—Lithopone. **Chemical Pigment Co.**
Lustrex—Polystyrene resins. **Monsanto Chemical Company**
Lustrex Latex—Polystyrene emulsion. **Monsanto Chemical Company Plastics Div.**
LX-685—Hydrocarbon resin. **Neville Chemical Co.**
Lytron—Interpolymer and styrene latices and resins for surface coatings and latex paints. **Monsanto Chemical Co., Plastics Div.**

M

M-50—Lead chromate pigment. **National Lead Co.**
MA 28-18—Vinyl alcohol-acetate resins. **Union Carbide Plastics Co.**
Macopol—Solvent soluble polymers. **McWhorter Chemicals, Inc.**
Maglited—Reactive magnesium oxide. **Merck Marine Magnesium Division**
Magnaflake—Metal Powders and Pastes. **Magna Manufacturing Company, Inc.**
Magnamix—Dispersing agent. **Raybo Chemical Co.**
Majestic Yellow—Permanent benzidine yellow. **Imperial Paper & Color Corp.**
Makanol—Unsaturated fatty alcohols. **The Stepan Chemical Company**
Malix 138—Limed wood rosin. **Newport Industries, Inc.**
Mammopol—Modified fish oil. **Pacific Vegetable Oil Corp.**
Mapico—Iron oxide pigments. **Columbian Carbon Company**
Marbon 8000—High-styrene resins. **Marbon Chemical**
Marbon 9200—Styrene copolymer, resin and pigment chips. **Marbon Chemical**
Marco—Unsaturated polyester resin. **Celanese Corp. of America**
Marcothex—Unsaturated polyester. **Celanese Corp. of America**
MarHard—Mar proofing agent. **Raybo Chemical Company**
Marinco CL—Extender. **Merck Marine Magnesium Division**
Marincate—Additive. **Merck Marine Magnesium Division**
Mark—Stabilizer. **Argus Chemical Corp.**
Marlex—Polyethylene. **Phillips Petroleum Co.**
Marlin Maroon—Yellowish BON maroon. **Standard Ultramarine & Color Company**
Marmix—Styrene-butadiene latices. **Marbon Chemical**
Maroc 6—Limed wood rosin. **Newport Industries, Div. of Heyden-Newport Chem. Corp.**
Maroon-gold—Transparent durable marroon pigment. **E. I. du Pont de Nemours & Co., Inc.**
Marvinol—Polyvinyl chloride resin. **Naugatuck Chemical Div. of U. S. Rubber Co.**
Maskit #2—Paint deodorant. **Aromatic Products, Incorporated**
Max Var—Varnishes. **McWhorter Chemicals, Inc.**
M C—Catalyst for unsaturated polyester resins. **Celanese Corporation of America**
M D—Aluminum powders & pastes. **Metal Disintegrating Company Inc**
M.D.A.—Methylene disalicylic acid. **Heyden Chemical Corporation Div. of Heyden Newport Chem. Corp.**
Melaqua—Water soluble resins. **American Cyanamid Co.**
Meadol—Lignin. **The Mead Corporation**
Melmac—Melamine-Formaldehyde resins. **American Cyanamid Company Plastics and Resins Div.**
Melurac—Bonding resin. **American Cyanamid Co.**
Mercadium—Cadmium mercury. **Imperial Color Chemical & Paper Corp.**
Mercadmolith Reds—Cadmium-Mercury colors. **The Glidden Co.**
Mersolite—Fungicides phenyl mercury salts. **Innis, Speiden & Co., Inc.**
Mert ZT—Fungicide. **Carolina Aniline & Extract Company**
Metalead—Metallic lead flakes. **Metalead Products Corporation**
Metasap—Suspending agent. **Div. of Nopco Chemical Co., Metsap Chem. Co.**
Metasol—Bacteriacides fungicides. **Metalsalts Corp.**
Methac—Methyl acetate-methanol. **The Borden Company**
Methocel—Methyl cellulose. **The Dow Chemical Company**
Methox—Plasticizer. **Ohio-Apex Div.**
Methyl acetone—Methyl acetate-methanol-acetone. **The Borden Company**
Methylac—Methyl acetate solvent. **The Colton Chemical Company**
Methylon—Chemical resistant coating intermediates. **General Electric Co.**
Metso 99—Surface active agents. **Philadelphia Quartz Company**
Mi-Cal—Calcium carbonate. **DeLore Div., National Lead Co.**
Micro-Cel—Synthetic calcium silicates. **Johns-manville**
Micro-Klean—Micronic disposable filter cartridge. **The Cuno Engineering Corp.**
Micro-Mica—Finely ground micronized mica. **The English Mica Company**
Micro Stardust—Magnesium silicate. **Tamms Industries, Inc.**
Micro Velva—Calcium carbonate extender pigment. **Carbola Chemical Company**
Midas Gold—Gold pigment. **R-B-H Dispersions**
Mijit—Grinding jar. **Paul O. Abbé, Inc.**
Mikro—Milling machinery. **Pulverizing Machinery Company**
Ill—Limed wood rosin. **Newport Industries, MInc.**
Miller—Crushers. **Franklin P. Miller & Sons, Inc.**
Milmer—Fungicides. **Monsanto Chemical Co.**
Ming Orange—Molybdate orange. **Kentucky Color & Chemical Company**
Mintrol Spirits—A new mineral spirits with a very mild odor. **American Mineral Spirits Co.**
Mirares—Rosin. **Crosby Chemicals, Inc.**
Mirasol—Alkyd resins. **C. J. Osborn Company**
Mixall Mixers—Claw mixing propellers. **Craddock Equipment Company, Inc.**
Mix Mor—Mixers. **Hy-R-Speed, Inc.**
Macatawa Red Tone—Lithol ruliene pigment **Holland Color & Chemical Co.**
Modicol—Synthetic thickener for latex paints. **Nopco Chemical Company**
Mogul—Channel carbon blacks. **Godfrey L. Cabot, Inc.**
Molacco—Carbon black pigment. **Columbian Carbon Company**
Mollescal—Leather-treating compounds. **General Aniline & Film Corp.**
Molora Maroon—Light BON maroon. **Standard Ultramarine & Color Company**
Monamine—Surface active agents. **Mona Industries, Inc.**
Monaquest—Chelating agents. **Mona Industries, Inc.**
Monarch—Channel carbon blacks. **Godfrey L. Cabot, Inc.**
Monarch—Copper phthalocyanine blue and green. **Imperial Paper & Color Corp.**
Monawets—Wetting agents. **Mona Industries, Inc.**
Monochrome Greens—Pigments; co-precipitated phthalocyanine blue and chrome yellow. **Imperial Paper and Color Corporation**
Monastral—Copper phthalocyanine blue and green. **E. I. du Pont de Nemours & Company Pigments Div.**
Monastral Red—Red organic pigment. **E. I. du Pont de Nemours, Pigment Div.**
Mondur—Isocyanate. **Mobay Chemical Co.**
Monopentek — Monopentaerythritol. **Heyden Chemical Corporation**
Monoplex—Monomeric ester plasticizers. **Rohm & Haas Company**
Monosulph—Emulsifier for water-based paints. **Div. of Nopco Chemical Co., Metasap Chem. Co.**
Montclair Red—Naphthol red toner. **Ansbacher-Siegle Corp.**
Morehouse—Grinding mills. **Morehouse-Cowles, Inc.**
Morningstar—Starches and Dextrines. **Morningstar, Nicol, Inc.**
M-P-A—Heat-stable specialty paint additive. **Baker Castor Oil Co.**
MPL Monomer—Autopolymerizable acrylic monomer. **The Borden Company, Polco Monomer Dept.**
M R—Unsaturated polyester resins. **Celanese Corporation of America**
MS2—Alicyclic ketone resin. **Howards & Sons, Ltd.**
Multicel—Diatomaceous earth. **Tamms Industries, Inc.**
Multiflex—Calcium carbonate extender pigments. **Diamond Alkali Company**
Multron—Polyester. **Mobay Chemical Co.**
Munn—Soda-treated wood rosin. **Newport Industries, Co., Div. of Heyden-Newport Chem. Corp.**
Myverol—High potency distilled monoesters. **Distillation Products Industries**

N

Naccolene Concentrate—Detergent. **National Aniline Division, Allied Chemical Corp.**
Nacconate—Diisocyanates. **National Aniline Division, Allied Chemical Corp.**
Nacconols—Detergents. **National Aniline Div. Allied Chemical Corp.**
Naccosol—Wetting agents. **National Aniline Division, Allied Chem. Corp.**
Naccotan—Dispersing agent. **National Aniline Division, Allied Chemical Corp.**
Nacromer—Pearl essence. **The Mearl Corp.**
Nadic—Dicarboxylic acid. **National Aniline Division, Allied Chemical Corp.**
Nalzin—Stabilizer. **National Lead Co.**
Natural-Shape Media—High density grinding media. **LZP Industrial Ceramics**
Naugatex—Copolymer latex. **Naugatuck Chemical Div., U. S. Rubber Co.**
Nebony—Thermoplastic hydrocarbon resins. **Neville Chemical Company**
Nekal—Wetting agent. **General Aniline & Film Corp.**
Neo-fats—Fatty acids. **Armour Industrial Chemical Co.**
Neolyn—Rosin derived alkyd resin. **Hercules Powder Company**
Neopone—Emulsifier. **Witco Chemical Co.**
Neo Spectra—Carbon black pigment. **Columbian Carbon Company**
Neosol—Ethyl alcohol proprietary solvent. **Shell Chemical Corporation**
Nesaco—Potato starch. **Morningstar, Nicol, Inc.**
Nettco—Agitating equipment. **New England Tank & Tower Company**
Neotrigan—Leather treating compound. **General Aniline & Film Corp.**
Nevillac—Phenol-modified coumarone and alkylated phenols. **Neville Chemical Company**
Nevidene—Coumarone-indene resins. **Neville Chemical Company**
Nevinol—Plasticizing and solvent oils. **Neville Chemical Company**
Nevsolv—Aromatic petroleum solvents. **Neville Chemical Company**
Newport Maroon—Transparent double maroon pigment. **E. I. du Pont de Nemours & Co., Inc. Pigments Dept.**
Newtrex—Special wood rosin. **Newport Industries, Inc., Div. of Heyden-Newport Chem. Corp.**
N-Glo 5&5Y—Rosin gloss oil. **Newport Industries**
Nildew-2—Fungicides. **Naftone, Inc.**
Nilskin—Anti-skinning agent. **Naftone, Inc.**
Nitro Fast—Hydrocarbon soluble dyes. **Sandoz, Inc.**
Non-fer-Al—Calcium carbonate extender pigments. **Diamond Alkali Company**
Non-Flocculating Green—Phthalocyanine greens. **B. F. Goodrich Chemical Co.**
Nonic—Surface active agents. **Industrial Div., Pennsalt**
Nonisols—Surface active agent. **Geigy Industrial Chemicals**
Nopco—Anti-foam agents, freeze-thaw stabilizers, wetting agents. **Nopco Chemical Company**

Nopco 1572-R—Polyvinyl acetate emulsion. **Nopco Chemical Company**

Nopcote—Polyamide resins. **Nopco Chemical Company**

Nopcosant—Dispersing agent. **Nopco Chemical Company**

Nopco wax 22-DS—Synthetic wax. **Nopco Chemical Company**

Nora—Soda-treated wood rosin. **Newport Industries, Div. of Heyden-Newport Chem. Corp.**

Norlin—Catalytically polymerized linseed and soybean oils. **Cargill, Inc.**

Normasol—Stabilizers for vinyls. **National Lead Company**

Norvan—Polyvinyl acetate emulsions. **R. T. Vanderbilt Company**

Nox-Rust—Corrosion inhibitor. **Danbert Chemical Co.**

NPA—Semi-alkyd vehicles. **Farnow, Inc.**

Nuact Paste—Lead "feeder" drier. **Nuodex Products Company, Div. of Heyden-Newport Chem. Corp.**

Naude—Grinding aid. **Nuodex Products Co., Div. of Heyden-Newport Chem. Corp.**

Nuba—Coumarone-indene resins. **Neville Chemical Company**

Nulix-15—Limed polymerized wood rosin. **Newport Industries, Inc.**

Nullapon—Sequestering agents. **Antara Chemicals Div. of Gen'l Aniline & Film Corp.**

Nulskin—Discontinued name for anti skinning agent. **Raybo Chemical Company**

Nuodex—Fungicides and driers. **Nuodex Products Company, Div. of Heyden-Newport Chem. Corp.**

Nuogel A. O.—Thickening agent. **Nuodex Products Company, Inc. Div. of Heyden-Newport Chem. Corp.**

Nuolates—Tallate driers. **Nuodex Products Company, Div. of Heyden-Newport Chem. Corp.**

Nuomix—Surface active agent. **Nuodex Products Company, Div. of Heyden-Newport Chem. Corp.**

Nuospet—Non-toxic paint preservative. **Nuodex Products Company, Div. of Heyden-Newport Chem. Corp.**

Nuosperse 657—A combination of surface active agents. **Nuodex Products Company, Div. of Heyden-Newport Chem. Corp.**

Nuozene—Sanitizing agent. **Nuodex Products Company, Div. of Heyden-Newport Chem. Corp.**

Nuroz—Polymerized wood rosin. **Newport Industries, Div. of Heyden-Newport Chem. Corp.**

Nutrex—Special wood rosin. **Newport Industries**

Nuvis—Bodying agents. **Nuodex Products Company, Div. of Heyden-Newport Chem. Corp.**

Nyco Super—Phthalocyanine blue and green pigments. **New York Color & Chemical Co.**

Nycolime—Phthalocyanine blue and green pigments. **New York Color & Chemical Co.**

Nylocet—fire-proofing agent. **Scher Bros.**

Nylox U—Disproportinated wood rosin. **Newport Industries**

Nytal—Talc. **R. T. Vanderbilt Company**

O

Octasol—Driers. **The Harshaw Chemical Co.**

Ohopex—Plasticizer. **Ohio-Apex Division**

Oitioil—Oiticica oil. **Brazil Oiticica, Inc.**

OKO—Polymerized linseed oils. **Spencer Kellogg & Sons, Inc.**

Omamid—Polyamide resin. **Olin Mathieson Chemical Corp.**

ONB—Ortho-nitrobiphenyl plasticizer. **Monsanto Chemical Company**

One Point—High speed mills. **Troy Engine & Machine Co.**

Oolitic—Dry milled calcium carbonates. **DeLore Div., National Lead Co.**

OO Silica Smoke—Amorphous Silica. **Tamms Industries, Inc.**

Opalon—Vinyl chloride resin. **Monsanto Chemical Company, Plastics Div.**

Opal wax—Hydrogenated castor oil. **Baker Castor Oil Co.**

Orion Red—Yellowish red pigment. **Sherwin-Williams Co.**

Oronite—Polybutene. **Oronite Chemical Co.**

Orthophen—Amyl phenols for antiskinning. **Industrial Div., Pennsalt**

Orthotone Orange—Ortho-Nitraniline orange. **Standard Uultramarine & Color Company**

Ozark—Zinc oxide. **Sherwin-Williams Co.**

Ozlo—Leaded zinc. **Sherwin-Williams Co.**

P

PUC—Dispersion mill. **Pfaudler Co.**

Paco Solvent TR-590—Proprietary alcohol solvent. **Publicker Industries, Inc.**

Paideos—Paint deodorants. **Dodge & Olcott, Inc.**

Paint Base Oil—Special pigmented base oil. **Pacific Vegetable Oil Corp.**

Paintodors—Paint deodorants. **Sindar Corporation.**

Paisflex—Polyvinyl acetate resin paint base (internally plasticized). **Morningstar-Paisley, Inc.**

Paisley—General line of liquid labeling glues. **Morningstar-Paisley, Inc.**

Palatine—Dye assistants. **General Aniline & Film Corp.**

Palconate—Surface active agent. **The Pacific Lumber Company**

Palcotan—Surface active agent. **The Pacific Lumber Company**

Palletier—Lift trucks. **Barrett-Cravens Co.**

Pamak—Tall oil fatty acids. **Hercules Powder Co.**

Panaflex BN—Hydrocarbon plasticizer. **Amoco Chemicals Corp.**

Panapol—Synthetic hydrocarbon drying oils. **Pan American Chemicals**

Panarez—Petroleum hydrocarbon resins. **Amoco Chemicals Corp.**

Panasol—High solvency aromatic solvents. **Amoco Chemicals Corp.**

Paradene—Coumarone-indene resins. **Neville Chemical Company**

Paragon—Kaolin. **J. M. Huber Corp.**

Paraplex—Plasticizers and polyester resins. **Rohm & Haas Company**

Parapol-S—High molecular weight copolymer of styrene and isobutylene. **Enjay Company, Inc.**

Parasepts—Anti-fungal and anti-bacterial agents. **Heyden-Newport Chemical Corporation**

Paricin—Saturated fatty ester plasticizers. **Baker Castor Oil Co.**

Parlon—Chlorinated natural rubber. **Hercules Powder Company**

Pastall—Driers. **The Harshaw Chemical Co.**

Pavoco Oil—Bodied linseed oil. **Pacific Vegetable Oil Corp.**

Pavoil—Bodied oil. **Pacific Vegetable Oil Corp.**

Pavolene—Refined linseed oil. **Pacific Vegetable Oil Corp.**

Pavolin Oil—Bodied linseed oil. **Pacific Vegetable Oil Corp.**

Pavasoy—Bodied soybean oil. **Pacific Vegetable Oil Corp.**

Pavosynth—Modified linseed oil. **Pacific Vegetable Oil Corp.**

Paxinosa—Ground limestone. **C. K. Williams & Co.**

Paxwax—Microcrystalline waxes. **National Wax Company**

PC 1244—Defoaming agent. **Monsanto Chemical Company**

PCP Castor Oil—Raw expeller oil, unbleached. **Pacific Vegetable Oil Corp.**

PE—Polyhydric alcohol. **Hercules Powder Co.**

Peerless—Kaolin clay. **R. T. Vanderbilt Co.**

PEFA—Esterified distilled tall oils. **Crosby Chemicals, Inc.**

Penbro—"B" wood resin. **Newport Industries, Div. of Heyden-Newport Chem. Corp.**

Penbro 83—Linseed wood rosin. **Newport Industries, Div. of Heyden-Newport Chem. Corp.**

Penglo—Tall oil penta ester solution. **Newport Industries**

Pennco—Pigment dispersions & Chips. **Pennsylvania Color & Chemical Company**

Pennsalt—Metal cleaners, alkaline paint strippers, and paint spray booth water conditioners. **Pennsalt Chemicals Corp.**

Penola—Aliphatic and Aromatic Solvents, Naphthas and Varsols. **Penola Oil Company**

Penros—Polymerized wood rosin. **Newport Industries**

Pent Acetate—Synthetic amyl acetate. **Industrial Div., Pennsalt Chemicals Corp.**

Pentacite—Pentaerythritol resins. **Reichhold Chemicals, Inc.**

Pentalyn—Pentaerythritol esters of rosin and phenolic-modified pentaerythritol esters of rosin. **Hercules Powder Company**

Pentasol—Synthetic amyl alcohols. **Industrial Div., Pennsalt**

Pentek—Pentaerythritol technical. **Heyden-Newport Chemical Corporation**

Perclene—Perchlorethylene. **E. I. du Pont de Nemours & Co., Inc., Electrochemicals Dept.**

Peregal—Dye stripping agent. **General Aniline & Film Corp.**

Perma-leaf—Aluminum paste. **Reynolds Metals Co.**

Permachlor Red—Red dry colors. **Sherwin Williams Co.**

Permachrom Red—Red pigments. **Sherwin-Williams Co.**

Permadine—Zinc phosphate coating chemicals for rust-proofing. **Amchem Products Corp.**

Permagel—Processed Fullers Earth thickener. **Minerals & Chemicals Corp. of America**

Permaline Blue—Phthalo Lake. **Whittaker, Clark & Daniels, Inc.**

Permanent—Phthalocyanine blue and green pigments. **New York Color & Chemical Co.**

Permansa—Nitroso naphthol green, chlor-para nitraniline red, and hansa yellow. **Sherwin-Williams Co.**

Permolith—Lithopone. **Sherwin-Williams Co.**

Permox—Lead chromate pigment. **Eagle Picher Co.**

Petrex—Unmodified Petrex alkyd resins. **Hercules Powder Co.**

Petro A A—Surface active agent. **Petrochemicals Company**

Petrodor—Paint solvent deodorants. **Dodge & Olcott, Inc.**

Petrohol—Isopropyl alcohol. **Enjay Company, Inc.**

Petrolene—Aliphatic petroleum thinner. **Anderson-Prichard Oil Corporation**

Petrolite—Emulsifiable waxes. **Petrolite Corporation, Ltd.**

Petrometer—Liquid level indicators. **Petrometer Corp.**

Petronauba—Emulsifiable petroleum wax. **Barreco Oil Company**

Petropon—Heavy petroleum polymers. **American Mineral Spirits Company**

Petro-Resins—Polymerized olefinic hydrocarbons. **Petroleums Specialties Company**

Petrosul—Petroleum sulfonate. **Pennsylvania Refining Company**

Petrothene—Polyethylene resins. **U. S. Industrial Chemicals Co.**

Phelate—Crosslinking reagent. **J. S. Ayers Co.**

Phillips 66—Hydrocarbon solvents. **Phillips Petroleum Company**

Phthalo—Phthalocyanine blue and green pigments. **New York Color & Chemical Co.**

Picco—Solvents & Solvent oils. **Pennsylvania Industrial Chemical Corporation**

Piccoflex—Hydrocarbon copolymer resin. **Pennsylvania Industrial Chemical Corp.**

Piccolastic—Low molecular wt. polystyrene resins **Pennsylvania Industrial Chemical Corp.**

Piccolyte—Polyterpene resins. **Pennsylvania Industrial Chemical Corporation**

Piccopale—Petroleum hydrocarbon resin. **Pennsylvania Industrial Chemical Corporation**

Piccopale Emulsion—Petroleum hydrocarbon resin emulsion. **Pennsylvania Industrial Chemical Corporation**

Piccoumaron—Coumarone-Indene resins. **Pennsylvania Industrial Chemical Corporation**

Piper Red—Pyrazalone red. **Ansbacher-Siegle Corp.**

P-K—Twin shell blender. **The Patterson-Kelly Company, Inc.**

Placco-Tex—Latex emulsion. **Borden Chemical Co.**

Planisol—Surface active agent. **The Girdler Company**

Plaskon—Alkyd molding compounds. **Plastics Coal Chemicals, Div. of Allied Chemical Corp.**

Plasticone—Pyrazolone red pigment. **Sherwin-Williams Co.**

Plasto—Dyes for plastics. **National Aniline Div. of Allied Chem. Corp.**

Plastoflex—Plasticizers. **Advance Solvents & Chemical Div. of Carlisle Chemical Works Inc.**

Plastograph—Processability recorder. **C. W. Brabender Instruments**

Plastolein—Chemical & resinous plasticizers. **Emery Industries, Inc.**

Pliolite latex—Styrene-butadiene emulsions. **The Goodyear Tire & Rubber Co. Inc.**

Pliolite, natural rubber—Cyclized natural rubber. **The Goodyear Tire & Rubber Co., Inc.**

Pliolite S-5—Styrene-butadiene resins. **The Goodyear Tire & Rubber Co. Inc.**

Pliovic—Polyvinyl chloride resins. **The Goodyear Tire & Rubber Co. Inc.**

Plumb-O-Sil—Stablizers for vinyls. **National Lead Company**

Pluracol — Polyethyelene gycols. **Wyandotte Chemicals Co.**

Pluronics—Emulsifying agent (nonionic). **Wyandotte Chemicals Corp.**

Plymouth—Stearates. **M. W. Parsons-Plymouth Inc.**

Plyophen—Phenolic resins. **Reichhold Chemicals, Inc.**

PMAC—High boiling solvent-polymethoxy acetal. **General Aniline & Film Corporation**

PMN-10—Fungicide. **Nuodex Products Co., Div. of Heyden-Newport Chem. Corp.**

PMO—10—Fungicide. **Nuodex Products Co., Div. of Heyden-Newport Chem. Corp.**

POE—Modified polyester enamel vehicle. **Farnow, Inc.**

Polaris Red—Red pigments. **Sherwin-Williams Co.**

Polectron—Electronic chemicals. **General Aniline & Film Corp.**

Polycin—Gelled castor oil. **Baker Castor Oil Co.**

Polyco—Resin emulsions. **The Borden Company**

Polyfon—Surface active agents. **West Virginia Pulp and Paper Company**

Poly G's—Polyethelyene glycols. **Olin Mathieson Chemical Corp.**

Polyite—Polyester Resins. **Reichhold Chemicals, Inc.**

Polymekon—Specially processed petroleum wax. **Warwick Wax Company, Inc., Div. of Sun Chemical Corp.**

Polymer C-3—Modified vinyl acetate resin. **Monsanto Chemical Co.**

Polyox—Water soluble resin. **Union Carbide Chemicals Co.**

Poly-pale Ester—Glycerol ester of polymerized rosin. **Hercules Powder Company**

Poly-Solv EE—Lacquer solvent. **Olin-Mathieson**

Poly-Sperse—Plasticizer. **National Polychemicals, Inc.**

Polytergents—Nonionic surface active agents. **Olin Mathieson Chemical Corp.**

Poly-Tex—Polyvinyl acetate copolymer emulsion. **Jones-Dabney Company**

Polytrol—Convertible resins. **McWhorter Chemicals, Inc.**

Polytung—Heat treated tung oil. **Degen Oil & Chemical Co.**

Porox—Grinding balls. **Porcelain Div., Ferro Corp.**

Potter-Bowser—Electronic meters. **Bowser, Inc.**

Potters—Reflective spheres. **Potters Brothers, Inc.**

Powerox—Power-driven lift trucks. **Barrett-Cravens Co.**

Preventol—Fungicides. **Antara Chemicals Div. of Gen'l Aniline & Film Corp.**
Primol—Latex emulsion leveling agent. **Fred'k A. Stresen-Reuter, Inc.**
Primex—Barytes. **DeLore Div., National Lead Co.**
Process-Bowser—Filters. **Bowser, Inc.**
Propocel—Cellulose derivative. **The Dow Chemical Company**
Protatek 53—Sodium alginate thickener. **Croda Inc.**
Protectol—Finishing agents. **General Aniline & Film Corp.**
Protectoseal—Equipment for protection against fires through the use of flammable liquids. **Protectoseal Company**
Protovacs—Cascinates. **The Borden Company**
PT—Pine tar, pine tar oil. **Godfrey L. Cabot, Inc.**
Puratized OL-28—Phenylmercury oleate. **Gallowhur Chemical Corporation**
Purecal—Ppt. calcium carbonate. **Wyandotte Chemicals Corp.**
Putrol—Deodorant. **Fritzsche Brothers, Inc.**
PVC 100—Polyvinyl chloride. **The Dow Chemical Company**
PX Plasticizers—Chemical and Resinous Plasticizers. **Pittsburg Coke & Chemical Co.**
Pycal—Chemical Plasticizers. **Atlas Powder Co.**
Pyrax—Foliated aluminum silicate. **Standard Mineral Corp.**
Pyrax—Aluminum silicate. **R. T. Vanderbilt Co.**
Pyropel—Fire-proofing agent. **Scher Bros.**
Pyrolux—Maroom pigment. **Sherwin-Williams Co.**

Q

QO—Furan chemicals & derivatives. **The Quaker Oats Company**
Quadrol—Ethylene diamine derivatives. **Wyandotte Chemicals Corp.**
Quindex—Copper-8 quinolinolate solution. **Nuodex Products Co., Inc.**
Quixept—Alkyd vehicle. **California Ink Co., Inc.**
QYNV—Vinyl chloride and vinyl chloride-acetate resins for dispersion coatings. **Union Carbide Plastics Co.**

R

R-64—Silicone resin for cold blending. **Silicones Div. Union Carbide Corp.**
R-856—Silicone-alkyd resin. **Dow Corning Corp.**
R-878 Resin—Silicone-alkyd resin. **Dow Corning Corp.**
Radiant Yellow—AAOT benzidine yellow toner. **Anabacher-Siegle Corp.**
Radox—Control system for lift trucks. **Barrett-Cravens Co.**
Ramapo—Resinated organic pigments. **E. I. du Pont de Nemours & Company, Pigments Dept.**
R & R—Bodying and surface active agents. **Ross & Rowe, Inc.**
Raven—Carbon black pigment. **Columbian Carbon Company**
Rayox—Titanium dioxide. **R. T. Vanderbilt Co.**
R-B-H—Pigment dispersions. **R-B-H Dispersions**
R C Plasticizer E S—Polymeric plasticizer. **Rubber Corporation of America**
RD 910—Stabilizer-thickner. **Minnesota Mining & Manufacturing Company**
REA—Hydrated aluminum silicate. **Georgia Kaolin Co.**
Readco—Mixers & materials handling equipment. **Read Standard Corporation**
RECO Brown—Concentrated brown iron oxides. **Reichard-Coulston, Inc.**
Red Diamond—Cylinder gas-CO_2. **Liquid Carbonic Corp.**
Red Giant—Hand lift truck. **Revolvator Co.**
Red Toner (Manganese) R-93—B.O.N. reds. **B. F. Goodrich Chemical Co.**
Regal Yellows—Chrome yellow pigment. **Imperial Paper and Color Corp.**
Repello—Water repellent. **Scher Bros.**
Resimene—Butylated melamine formaldehyde resins. **Monsanto Chemical Company, Plastics Div.**
Resimene-U—Butylated urea formaldehyde resins. **Monsanto Chemical Company Plastics Div.**
Resinox P97—Phenolic resin. **Monsanto Chemical Company**
Resipel—Water repellent. **Scher Bros.**
Restco—Strainers, paddles, yardsticks. **Reliable Strainer Mfg. Co.**
Resyn—Polyvinyl acetate emulsions. **National Starch Products Inc.**
Resoflex—Plasticizers. **Cambridge Industries, Inc.**
Revolvator—Materials handling equipment. **Revolvator Company**
Rex Orange—Molybdate orange. **Imperial Paper & Color Corp.**
Reynolds Metals—Aluminum Powder & Paste. **Reynolds Metals Company**
Reynolized—Aluminum paste pigment. **Reynolds Metals Company**
Rezamul—Alkyd Emulsions. **Reichhold Chemicals, Inc.**
Rezimac—Oil modified alkyds. **McWhorter Chemicals, Inc.**
Rezyl—Oil & resin-modified alkyd resins. **American Cyanamid Company, Plastics & Resins Div.**
Rheotol—Surface active agent. **R. T. Vanderbilt Company**
Rhoplex—Acrylic resin dispersions. **Rohm & Haas Company**
Rhoplex AC-33—Acrylic emulsion. **Rohm & Haas Company**
Rhotex—Emulsified resin. **Rohm & Haas Co.**
Richmond Green Dispersion—Pigment green **Ansbacher-Siegle Corp.**
Roalox—Grinding mill jars. **The U. S. Stoneware Co.**
Rocker-Roll—Drum mixers. **The U. S. Stoneware Co.**
Rodine—Pickling acid inhibitors. **Amchem Products Corp.**
Roller Type—Laboratory mills. **The U. S. Stoneware Co.**
Roman—Manganese-BON pigment. **Kentucky Color & Chemical Co.**
Rotator—Drum truck. **Morse Manufacturing Company, Inc.**
Rotocan—Change-can mixers. **Baker Perkins, Inc.**
Rota-cone—Blender; vacuum drier. **Paul O. Abbé, Inc.**
Royal Spectra—Carbon blacks. **Columbian Carbon Co.**
Rubanox Red—Lithol Rubine. **Sherwin Williams Co.**
Rubine Reds—Organic red pigments. **Imperial Paper & Color Corp.**
Rustib—Corrosion inhibitor. **Raybo Chemical Company**
RV—Flatting paste. **R-B-H Dispersions**

S

SAIB—Sucrose diacetate hexaisobutyrate. **Eastman Chemical Products, Inc.**
Safe-T-Hues—Special non-toxic colorants. **H. Kohnstamm & Company, Inc.**
Safflower 22—Isomerized safflower oil. **Pacific Vegetable Oil Corp.**
Saflex—Polyvinyl butyral. **Monsanto Chemical Company Plastics Dept.**
Sag—Antifoam agent. **Silicones Div., Union Carbide Corp.**
St. Joe—Lead-free zinc oxide. **St. Joseph Lead Company**
Santicizer—Chemical plasticizers. **Monsanto Chemical Company**
Santocel—Extender pigment, silica aerogel. **Monsanto Chemical Company**
Santolite—Aryl sulfonamide-formaldehyde resins. **Monsanto Chemical Company**
Santomerse—Anionic surface active agent. **Monsanto Chemical Co.**
Sapona Reds—Soapfast reds. **Standard Ultramarine & Color Company**
Saran—Vinylidene Chloride polymers. **The Dow Chemical Company**
Sarkosyls—Emulsifiers and anti-corrosive agents. **Geigy Industrial Chemicals**
Schercolene—Dispersing agent. **Scher Bros.**
Scotch Brand—Talcs. **Southern California Minerals Company**
Sea Gull Brand—Ultramarine blue. **Reckitt's England**
Sealed-Disc—Paint filters. **Alsop Engineering Corporation**
Seal-Kyd—Alkyd vehicle. **California Ink Co., Inc.**
Seatone—Flushed colors for water emulsion paints. **Hilton-Davis Chemical Co.**
Sequestrene—Metal complexing agent. **Geigy Industrial Chemicals**
Serene—Benzidine yellow. **Sherwin-Williams Co.**
Ser-X—Extender pigment; Sericite (hydrous aluminum silicate). **Innis, Speiden & Co., Inc.**
Shamrock—Hansa yellow. **Sherwin-Williams Co.**
Shannon-Glow—Black light fluorescent products. **Shannon Luminous Materials Co.**
Shannon Line—Black light lamps. **Shannon Luminous Materials Co.**
Shear-flow—Mixers. **Gabb Special Products**
Sheffield—Colors & tints. **Sheffield Bronze Paint Corp.**
Shellmax—Micro crystalline waxes. **Shell Oil Company**
Shell Sol—Stoddard solvent. **Shell Oil Company**
Shell wax—Paraffin waxes. **Shell Oil Company**
Sher-Will-Glo—Fluorescent colors. **Sherwin-Williams Co.**
Ship Pitch—Pitch. **Newport Industries, Inc., Div. of Heyden-Newport Chemical Co.**
Sierra Fibrene—Extender pigment; Talco (magnesium silicate). **Innis, Speiden & Co., Inc.**
Sierra Miatron—Extender pigment; Talc (magnesium silicate). **Innis, Speiden & Co., Inc.**
Sight-O-Matic—Paint mills. **J. M. Lehmann Co., Inc.**
Silastic—Silicone rubber. **Dow Corning Corp.**
Silex—Extender pigment; hard silica. **Innis, Speiden & Company, Inc.**
Silvar—Aluminum pastes & powders. **Silberline Mfg. Company, Inc.**
Silver Bond "B" Silica—Crystalline-hard silica. **Tamms Industries, Inc.**
Silvex—Aluminum pigment. **Silberline Mfg. Company, Inc.**
Sinclair—Solvents. **Sinclair Chemicals Inc.**
Skelly solve—Aliphatic hydrocarbon solvents **Skelly Oil Co.**
Skyline Blue—Phthalocyanine blues. **B. F. Goodrich Chemical Co.**
Smico—Process equipment. **Southwest Mill Industrial Equipment Company**
Smithko—Pigments and extenders. **Smith Chemical & Color Company**
Socal Petrolatum—Waxes. **Standard Oil Co. of California**
Socal Solvent—Aromatic Solvent. **Standard Oil Company of California**
Softex—Blue pigment. **Kentucky Color & Chemical Co.**
Softex Red—Precipitated pure red oxide. **Reichard-Coulston, Inc.**
Solarite—Hydrocarbon resin. **Solar Compounds Corp.**
Sole-Onic CDS—Emulsifier, antifoamer. **Sole Chemical Corp.**
Solfast—Lightfast organic red, phthalocyanine blue. **Sherwin-Williams Co.**
Solinox—Process linseed oil. **Spencer Kellogg & Sons, Inc.**
Solox—Solvent. **U. S. Industrial Chemicals Co.**
Solros—Heat-treated wood rosin. **Newport Industries, Inc.**
Soltrol—Odorless paint solvents & thinners. **Phillips Petroleum Company**
Solvenol—Mixer terpene solvent. **Hercles Powder Company**
Solvent #30—Terpene solvent. **Newport Industries, Inc.**
Solvesso—Aromatic petroleum solvents. **Esso Standard Oil Company**
Solvoflex—Gaskets. **The U. S. Stoneware Co.**
S-O-M—Sight-O-Matic control of roll pressures. **L. M. Lehmann Co., Inc.**
Sorapon—Alkyl aryl sulfonates. **General Aniline & Film Corp.**
Sorbo—70% sorbitol solution. **Atlas Powder Co.**
Sovasol—Aliphatic petroleum solvents. **Socony-Vacuum Oil Company**
Soya Paint Oil—Modified soybean oil. **Pacific Vegetable Oil Corp.**
Soya Solinox—Process soybean oil. **Spencer Kellogg & Sons Inc.**
Soyates—Soybean driers. **The Harshaw Chemical Company**
Soywood Oil—Co-polymerized combination of refined soybean oil and tung oil. **Pacific Vegetable Oil Corp.**
SP Alizarine Maroon MV-7013—Alizarine maroons. **B. F. Goodrich Chemical Co.**
Spalibar—Water repellent. **Silicones Div., Union Carbide Corp.**
Span—Emulsifiers; fatty acid esters of sorbito anhydrides. **Atlas Powder Company**
Spangle—Aluminum paint improver. **Raybo Chemical Company**
Sparkler—Horizontal plate filters. **Sparkler Mfg. Co.**
Sparmite—Very fine barium sulfate. **C. K. Williams & Company**
Sparsol—Vinyl type polymer. **Sparta Industries**
SP Blue Toners BT-8—Tungstated blues and violet. **B. F. Goodrich Chemical Co.**
Specimen—Grinding jar. **Paul O. Abbé, Inc.**
Spectronic 20—Colorimeter. **Bausch & Lomb Optical Company**
Speedy-Pak—Fibre drum. **Bennett Industries, Inc.**
Speedee Mite—"Miniature paint factory in a test tube." **Charles E. Baker Company**
Spenkel—Polyurethane. **Spencer Kellogg & Sons Inc.**
Spheron—Channel carbon blacks. **Godfrey L. Cabot, Inc.**
Sprayon—Line of aerosols. **Sprayon Products, Inc.**
SR—Silicone resins. **General Electric Co.**
Stabelan—Vinyl stabilizers. **Harwick Standard Chemical Company**
Staley's—Soybean oils. **A. E. Staley Mfg. Co.**
Staybelite Ester—Glycerol ester of hydrogenated rosin. **Hercules Powder Company**
Stabilizer D-22—Dibutyl tin dilaurate. **Union Carbide Chemicals Company**
Stamford—Aluminum pastes & powders. **Silberline Mfg. Company, Inc.**
Standard—Zinc dust. **New Jersey Zinc Co.**
Standard Refined Wax—Waxes. **Standard Oil Company of California**
Standard Thinner—Aliphatic thinners. **Standard Oil Company of California**
Standardaire—Blower. **Read Standard Corp.**
Stardust—Magnesium silicate. **Tamms Industries, Inc.**
Sta-Sol—Soybean lecithin concentrate. **A. E. Staley Mfg. Co.**
Statex—Carbon black pigment. **Columbian Carbon Company**
Stayco—Oxidized corn starch. **A. E. Staley Mfg. Co.**
Stayrites—Vinyl stabilizer. **Witco Chemical Co.**
Stearite—Dispesing agent. **Witco Chemical Co.**
Steelco—Distilled tall oils. **K. A. Steel Chemicals, Inc.**
Sterling—Oil and gas furnace and gas thermal carbon blacks. **Godfrey L. Cabot, Inc.**
Stern-Tite—Paint cans. **Stern Can Co., Inc.**
Sterox—Nonionic surface active agents. **Monsanto Chemical Co.**
Steveco—Mixers, grinding equipment, tanks, fans, blowers. **The Stevenson Company**
Streako—Metallic Soaps. **W. H. Fales Co.**

Strypp-Away—Liquid paint stripper. **The DuBois Company, Inc.**
Stycast—Polystyrene casting resins. **Emerson & Cuming, Inc.**
Stypol—Polyester resins. **H. H. Robertson Co.**
Styresol—Styrenated alkyd resins. **Reichhold Chemicals, Inc.**
Styretex—Styrenated alkyd resins. **Jones-Dabney Company**
Styron—Polystyrene. **The Dow Chemical Co.**
Sulframin—Wetting applications. **Witco Chemicals Co.**
Sunaptic—Naphthenic acids. **Sun Oil Co.**
Sunoco—Solvents. **Sun Oil Co.**
Sunolite—Anti-sunchecking wax. **Witco Chemical Co.**
Sunolith—Lithopone. **The Glidden Company**
Sun Yellow—Pigment. **The Harshaw Chemical Co.**
Super Ad-It—Fungicide. **Nuodex Products Company, Div. of Heyden-Newport Chem. Corp.**
Super Aetna Crimson Red Oxide—Produced from crude Persian Gulf red oxide. **Reichard-Coulston, Inc.**
Supercarbovar—Channel carbon blocks. **Godfrey L. Cabot, Inc.**
Super Ester Gum—Pentaerythritol ester of rosin. **Crosby Chemicals, Inc.**
Superjet—Lampblack. **C. K. Williams & Co.**
Super Lacros—Maleic modified rosin esters (glycerol-type). **Crosby Chemicals, Inc.**
Superloid—Granular high viscosity ammonium alginate. **Kelco Co.**
Super Spectra—Carbon black pigment. **Columbian Carbon Company**
Super Three—Roller mills. **Kent Machine Works, Inc.**
Superba—Carbon black pigment. **Columbian Carbon Company**
Super-Beckacite—Pure phenolic resins. **Reichhold Chemicals, Inc.**
Super-Beckamine—Melamine-formaldehyde Resins. **Reichhold Chemicals, Inc.**
Super-Beckosol—Isophthalic Acid Alkyd Resins **Reichhold Chemicals, Inc.**
Super IMperse—Aqueous pigment dispersions. **Imperial Paper & Color Corp.**
Supercarbovar—Channel carbon blacks. **Godfrey L. Cabot, Inc.**
Superflo—Linseed grinding oils. **Spencer Kellogg & Sons, Inc.**
Superfyde—Formaldehyde polymer. **Heyden Newport Chemical Corporation**
Superior—Linseed varnish oils. **Spencer Kellogg & Sons, Inc.**
Superior—Soybean varnish oils. **Spencer Kellogg & Sons, Inc.**
Superjet—Lampblack. **C. K. Williams & Co.**
Super-sol—odorless naphtha. **Pennsylvania Refinishing Company**
Supramine—Dye assistants. **General Aniline & Film Corp.**
Supreme—Crushers, pulverizers. **Franklin P. Miller & Son, Inc.**
Suprex—Kaolin. **J. M. Huber Corp.**
Surfactol—Surfactant. **Baker Castor Oil Co.**
Surfex—Calcium carbonate extender pigments. **Diamond Alkali Company**
Surfynol—Surface active agent, dispersant, liquid defoamer. **Air Reduction Chemical Co.**
Suspenso—Calcium carbonate extender pigments. **Diamond Alkali Company**
Susperse—Anti-sagging, anti-settling, wetting and dispersing agent. **Raybo Chemical Co.**
Swiveloader—Material handling equipment. **Stephens-Adamson Mfg. Company**
Sylodi—Extender pigments; silica. **Davison Chemical Company**
Syl-Kem—Silicone intermediate. **Dow Corning Corp.**
Sylkyd—Reactive silicone intermediate. **Dow Corning Corp.**
Sylvan Green—Chrome green pigments. **Imperial Color Chemical & Paper Corp.**
SynPar—Hard, high-melting wax. **H. L. Barnebey**
Syntex—Alkyd resins. **Jones-Dabney Company**
Synthaline Blue—Pure phthalo toner. **Whittaker, Clark & Daniels, Inc.**
Synthe-Copal—Ester gum resins. **Reichhold Chemicals, Inc.**
Synthemul—Alkyd emulsion. **Reichhold Chemicals, Inc.**
Synthenol—Dehydrated castor oil. **Spencer Kellogg & Sons, Inc.**
Syn-U-Tex—Butylated urea formaldehyde resins. **Jones-Dabney Company**
Synvarite—100% phenolic resins. **Synvar Corp.**
Synvarol—Butylated urea resins. **Synvar Corp.**

T

T 1215—Polymerized linseed oils. **Spencer Kellogg & Sons, Inc.**
T24-9—Vinyl alcohol-acetate resin. **Union Carbide Plastics Co.**
Tallene—Tall oil pitch. **West Virginia Pump & Paper Co.**
Tartan Colors—Organic lakes and toners. **Magruder Color Co., Inc.**
Tasco—Talc. **Tamms Industries, Inc.**
T.A.T. Bentonite—Colloidal clay. **Tamms Industries, Inc.**
TBTO—Agcides, fungicides, mildewcides. **Metal & Thermit Corp.**
T. C.—Calcium carbonates. **Tamms Industries, Inc.**
Tecquinol—Technical hydroquinone. **Eastman Chemical Products, Inc.**
Tecsol—Proprietary solvent based on ethyl alcohol. **Eastman Chemical Products, Inc.**
Tenex—Heat-treated wood rosin. **Newport Industries**
Tenlo 70—Pigment grinding aid. **Nopco Chemical Company**
Tenn-Plas—Benzoicacids. **Tennessee Products & Chemical Corp.**
Tenn-Sil—Fillers. **Tennessee Products & Chemical Corp.**
Tergitol—Nonionic and anionic surface active agents. **Union Carbide Chemical Company**
Tetronic—Nonionic wetting agent and dispersant. **Wyandotte Chemicals Corp.**
Texaphor—Anti-setting agent. **Dehydag Deutsche Hydrierwerke GMBH**
Texapon—Stabilizer and suspension agent. **Dehydag Deutsche Hydrierwerke GMBH**
Texas—Pigment blacks. **Sid Richardson Carbon Co.**
Textile Spirits—An aliphatic naphtha having an evaporation range similar to benzol. **American Mineral Spirits Company**
Texturized—Dispersible dry pigments. **Mineral Pigments Corp.**
T-Glo-8 & 8Y—Tall oil gloss oil. **Newport Industries**
Thermatomic Black—Special purpose carbon black. **Thermatomic Carbon Co.**
Thermatomic Black—Low oil adsorption black. **R. T. Vanderbilt Co.**
Thermax, P-33—Carbon blacks. **R. T. Vanderbilt Company**
Thermoil-Granodine — Maganese ironphosphate coating chemicals for wear-proofing and rust-proofing. **Amchem Products, Inc.**
Thermolite—Stabilizers for vinyls. **Metal & Thermit Corporation**
THFA—Tetrahydrofurfuryl alcohol. **The Quaker Oats Company**
Thixin—Multi-purpose paint additive. **Baker Castor Oil Co.**
Thoro-Blender—Conical dry blender & mixer. **Patterson Foundry & Machine Company**
Ti-Cal—Titanium calcium pigments. **E. I. du Pont de Nemours & Company, Pigments Dept.**
Tipen—Isophthalic tall oil alkyd. **Farac Oil & Chem. Co.**
Tints-All—Universal tinting colors. **Sheffield Bronze Paint Corp.**
Ti-Pure—Titanium dioxide pigments, rutile and anatase. **E. I. du Pont de Nemours & Co., Pigments Dept.**
Titanolith—Titanated lithopone. **The Glidden Company**
Titanox—Titanium dioxide pigments; rutile, anatase, non-pigmentary, titanium calcium. **Titanium Pigment Corporation**
TK—Flatting paste. **R-B-H Dispersions**
TMC—Cylinders and spheres for aerosol products. Receivers for refrigeration. **Tube Manifold Corp.**
TME—Trimethylolethane. **Heyden-Newport Chemical Corporation**
TMP—Trimethylolpropane. **Heyden-Newport Chemical Corporation**
Tolbe—Tall oil pitch. **Newport Industries, Div. of Heyden-Newport Chemical Corp.**
Tolusol—Lacquer diluent. **Shell Oil Company**
Towmotor—Forklift trucks. **Towmotor Corp.**
Toxilic—Maleic acid. **National Aniline Division Allied Chem. Corp.**
Toximul 250—Emulsifier. **Ninol Laboratories**
Transphalt—Asphaltic hydrocarbon resin. **Pennsylvania Industrial Chemical Corporation**
Transveyor—Compact, low-cost stacker. **Automatic Transportation Company**
Troykyd—Fungicides, puffing & bodying agents, anti-floating agents, anti-sagging agents, anti-settling agents, santi-skinning agents, wetting agents, dispersing agents. **Troy Chemical Co.**
Triangel—Carbon black. **United Carbon Co., Inc.**
Tribase—Stabilizers for vinyls. **National Lead Company**
Triclene—Trichlorethylene. **E. I. du Pont de Nemours & Company, Inc., Electrochemicals Dept.**
Tri-Homo—Homogenizing machinery. **Tri-Homo Corporation**
Tripentek—Tripentaerythritol technical. **Heyden Newport Chemical Corporation**
Triple Action—High speed colloid mills. **Troy Engine & Machine Co.**
Triton—Surface active agents. **Rohm & Haas Company**
Troluoil—Aliphatic petroleum thinner. **Anderson-Prichard Corporation**
Troykyd—Driers. **Troy Chemical Co.**
Troysan—Mildewcide. **Troy Chemical Co.**
Troyolin—Driers. **Troy Chemical Co.**
Tulip—Tone colors. **Holland Color & Chemical Co.**
Tween—Emulsifiers; polyoxyethylene sorbitan fatty acid esters. **Atlas Powder Company**
Twitchell—Emulsifying agents. **Emery Industries, Inc.**
Ty-Bond—Zinc phosphate coating for metal. **Cowles Chemical Company**
Typhoon Agitator—Portable liquid mixer. **Patterson Foundary & Machine Company**
Ty-Ply—Adhesive. **Marbon Chemical**

U

Ucon—Product trade name. **Union Carbide Chemicals Co., Div. Union Carbide Corp.**
Ubatol—Modified polystyrene emulsion. **Union Bay State Chemical Co., Inc.**
Uformite—Urea formaldehyde and melamine-formaldehyde resins. **Rohm & Haas Company**
Ultrapole S—Amine condensate. **Ultra Chemical Works, Inc.**
Ultrapole—Detergent. **Witco Chemical Co.**
Ultra-Turrax—Colloid Mills. **Cartrite International, Inc.**
Unapex—Latex paint base. **Naftone, Inc.**
Uneek—Universal vehicle. **Farnow, Inc.**
Unimixers—Vertical liquid mixer. **Patterson Foundry & Machine Company**
Unipower—Agitator-mixer drive. **Patterson Foundry & Machine Company, Div. of Ferro Corp.**
Unitane—Titanium dioxide pigment. **American Cyanamid Co. Pigments Div.**
Unitol—Refined Tall Oil. **Union Bag & Paper Corporation**
Uplifter—Portable elevator. **Revolvator Co.**
Urac—Bonding resin. **American Cyanamid Co.**
U.S.I. Isosebacic Acid—Mixture of isomers of sebacic acid. **U. S. Industrial Chemicals Co.**
USS—Aromatic hydrocarbon solvents. **United States Steel Corporation**
USCO Resin—Oil-modified alkyd. **U. S. Coatings Co.**
USSCO—Ball mills. **The U. S. Stoneware Co.**
UTC—Tinting colors. **California Ink Co., Inc.**
Utilitank—Glass lined storage tanks. **The Pfaudler Company**
Uversol—Driers. **The Harshaw Chemical Company**
Uvinul—Ultraviolet absorbers. **Antara Chemicals, Div. of Gen'l Aniline & Film Corp.**

V

Vac Dry—Bleached shellac gun. **William Zinsser & Co., Inc.**
VAGH—Vinylchloride-acetate resins. **Union Carbide Plastics Co.**
Vale Green—Chrome green pigment. **Imperial Paper & Color Corp.**
Vancide—Fungicides. **R. T. Vanderbilt Co.**
Vandor—Paint deodorant. **van Ameringen-Haebler, Inc.**
Varagua—Water paint vehicle. **McCloskey Varnish Co.**
Varayd—Alkyds. **Farnow, Inc.**
Varez—Resin solutions. **McCloskey Varnish Co.**
Vari-Visco—Filling machine. **The Karl Kiefer Machine Co.**
Varkydols—Special drying oils. **McCloskey Varnish Company**
Varkyds—Alkyds, phthalic, non-phthalic and modified. **McCloskey Varnish Company**
Veegum—Magnesium aluminum silicate. **R. T. Vanderbilt Company**
Velsicol—Hydrocarbon resins and aromatic hydrocarbon solvents. **Velsicol Corporation**
Velvet Green—Chrome green pigment. **Imperial Paper & Color Corp.**
Velveteen "R" Silica—Amorphous silica. **Tamms Industries, Inc.**
Venus Natural Copper—Flake Copper Powder. **U. S. Bronze Powder Works, Inc.**
Venus Palegold—Gold bronze powder. **U. S. Bronze Powder Works, Inc.**
Vera Blanc—Water ground calcium carbonate. **DeLore Div., National Lead Co.**
Versamides—Polyamide resins. **General Mills, Inc.**
Vibramount—Vibration isolation pads. **American Felt Co.**
Vibrin—Pollyester resins. **Naugatuck Chemical**
Vi-Cron—Very fine ground limestone. **C. K. Williams & Company**
Vinac—Polyvinyl acetate resins and emulsions. **The Colton Chemical Company**
Vinol—Polyvinyl alcohol. **The Colton Chemical Co.**
Vinsol—Resin derived from southern pine wood. **Hercules Powder Company**
Vinsol Ester Gum—Gylcerol ester of vinsol. **Hercules Powder Company**
Vinylite—Vinyl resins: acetate, chloride-acetate, chloride, alochol and butyral. **Union Carbide Plastics Co.**
Vinymul—Polyvinyl acetate emulsion. **Morningstar-Paisley, Inc.**
Violite—Luminescent pigments. **Rhode Island Laboratories, Inc.**
Virginia Red Toners—Chlorinated lithol rubine. **Standard Ultramarine & Color Co.**
Viscorder—Viscosimeter. **C. W. Brabender Instruments**
Viscotrel-A—Thixotropic agent. **Ferro Chemical Corp.**
Viscoyate—Bodied oil. **California Ink Co., Inc.**
Viskoplus—Aluminum naphthenate. **Advance Solvents & Chemical Div. of Carlisle Chemical Works, Inc.**
Vistac—Rubber plasticizers. **Advance Solvents & Chemical Div. of Carlisle Chemical Works, Inc.**
Viton—Synthetic rubber. **E. I. DuPont de Nemours & Co.**
VMCH—Vinyl chloride-acetate resins. **Union Carbide Plastics Co.**

Voidox—Tertiary butylated phenol. **Guardian Chemical Corporation**

Vulcan—Oil furnace carbon black. **Godfrey L. Cabot, Inc.**

Vulcan—Steel shipping containers. **Vulcan Containers, Inc.**

VVF Pigments—Very fine natural iron oxides. **C. K. Williams & Company**

VYCM-1-2—Vinyl chloride and vinyl chloride-acetate resins for dispersion coatings. **Union Carbide Plastics Co.**

VYCM-3—Vinyl chloride-acetate resins. **Union Carbide Plastics Co.**

Vygen—Polyvinyl chloride resin. **The General Tire & Rubber Company**

VYHH—Vinyl chloride-acetate resins. **Union Carbide Plastics Co.**

VYLF—Vinyl chloride-acetate resins. **Union Carbide Plastics Co.**

Vynite—Collapsible tubes for paint pigments. **Contenental Can Company, Inc.**

VYNS—Vinyl chloride-acetate resins. **Union Carbide Plastics Co.**

VYNV-1-2—Vinyl chloride and vinyl chloride-acetate resins for dispersion coatings. **Union Carbide Plastics Co.**

VYNW-5—Vinyl chloride-acetate resins. **Union Carbide Plastics Co.**

W

Wallkyd—Alkyd resin vehicles. **Reichhold Chemicals, Inc.**

Wallpoll—Plasticized vinyl acetate emulsion. **Reichhold Chemicals Inc.**

Walltax—Wall sizings. **Hayes Adhesives Co. Inc.**

Watchung—Permanent red 2B pigments. **E. I. du Pont de Nemours & Company**

WC-130—Polyvinyl acetate emulsion. **Union Carbide Plastics Co.**

Weather-Ometer—Accelerated Weathering Machines. **Atlas Electric Devices Company**

Wetall—Wetting agent. **Scher Bros.**

Wet-Edge Spirits—Aliphatic hydrocarbon thinner. **Anderson-Prichard Oil Corporation**

Wemco—Torque flow solids pump. **Western Machinery Company**

Windsor—Non-woven bonded filter fabrics. **American Felt Co.**

Witall—Tall oil driers. **Witco Chemical Co.**

Witcarb—Precipitated calcium carbonate. **Witco Chemical Company**

Witicizers—Plasticizers. **Witco Chemical Co.**

Witco—Paint driers, surface active agents, & stearates. **Witco Chemical Company**

Witcoblak—Furnace or channel blacks. **Witco Chemical Company**

Wittox—Copper & Zinc naphthenates. **Witco Chemical Company**

Wonex—Soda-treated wood rosin. **Newport Industries, Div. of Heyden-Newport Chem. Corp.**

X

X Universal Colorants—Tinting colors. **California Ink Co., Inc.**

XR-859, XR-875 Resins—Silicone — phenolic resins. **Dow Corning Corporation**

XX—Lead-free zinc oxide. **New Jersey Zinc Co.**

XYHL, XYSG—Vinyl butyral resins. **Union Carbide Plastics Co.**

Xlor Barytes—White barytes. **DeLore Div. National Lead Co.**

X-2280—Anti-floating agent. **Imperial Color Chemical & Paper Corp.**

X-2600—Benzidine Yellow. **Imperial Color Chemical & Paper Corp.**

Y

Yelkin—Lecithin. **Ross & Rowe, Inc.**

Z

Zeco—Ashalts, stearine pitches, gilsonite. **G. S. Ziegler & Company**

Zeolex—Ultra fine silico aluminate. **J. M. Huber Corp.**

Zinar—Zinc resinate. **Newport Industries**

Zinol—Zinc resinate. **Newport Industries**

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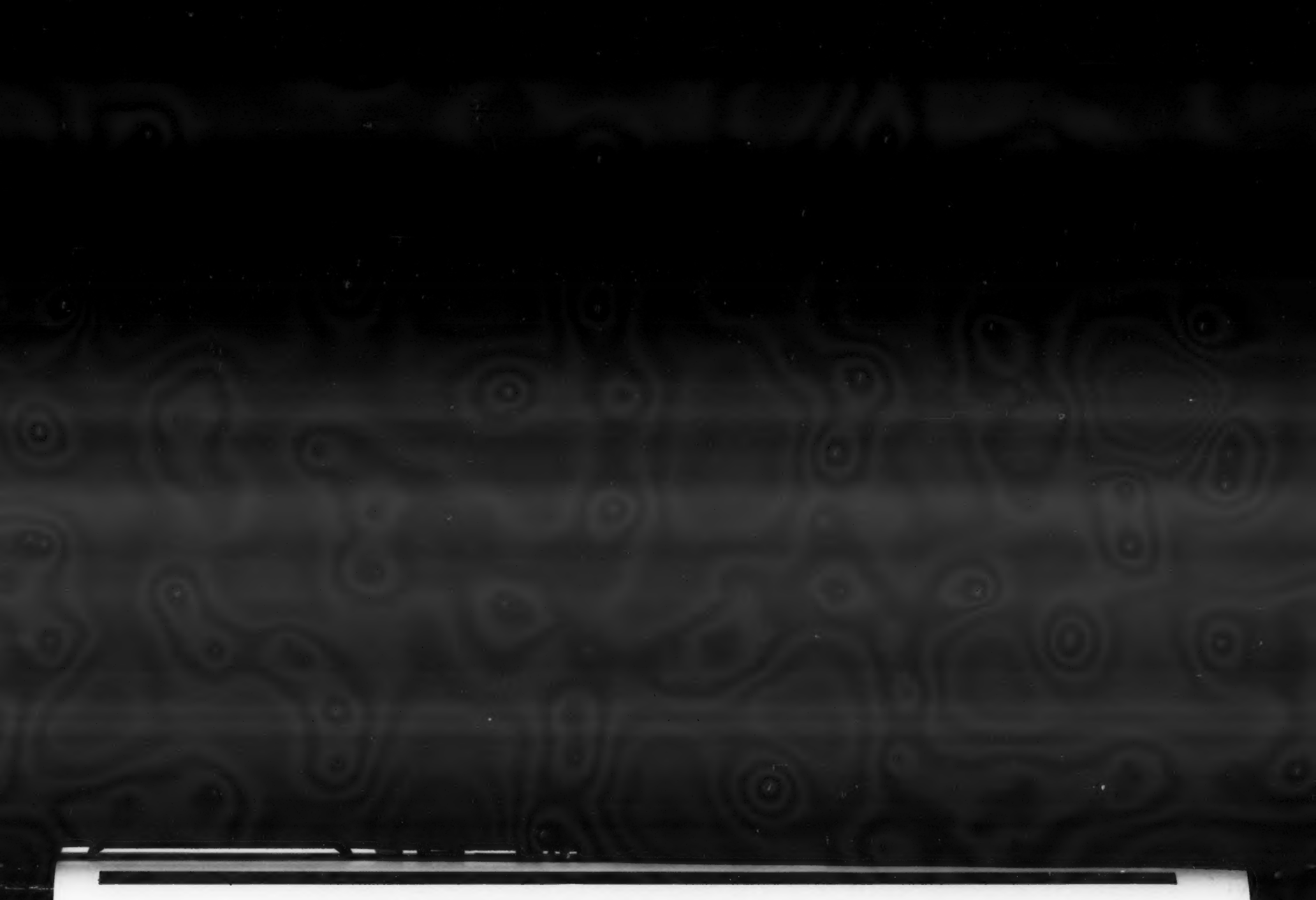
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